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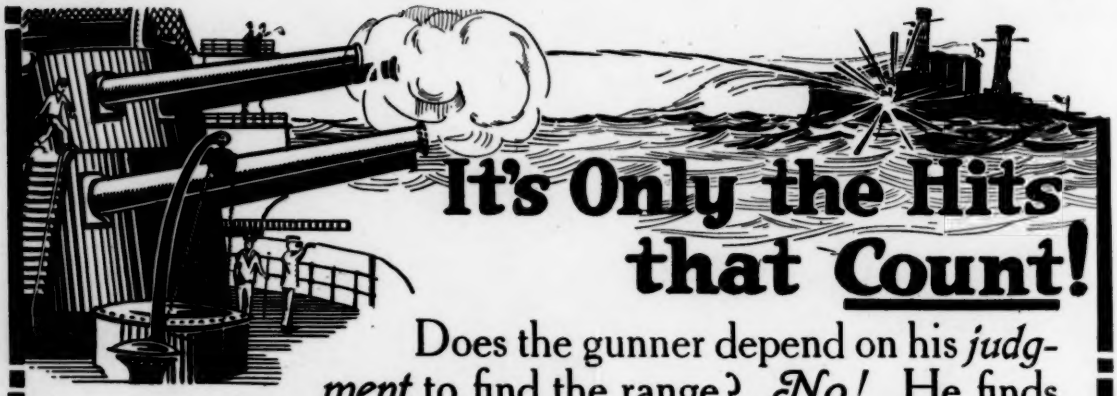

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THE AMERICAN JOURNAL OF ROENTGENOLOGY

Editor, P. M. Hickey, M. D., Detroit

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TEACHING OF ROENTGENOLOGY IN UNDERGRADUATE MEDICAL SCHOOLS

BY FRED C. ZAPFFE, M.D., F.A.C.S., CHICAGO

THE investigation outlined and tabulated in the following tables was made to gain an idea of the status of roentgenology in the curriculum of the undergraduate medical school. Roentgenology is an established and recognized specialty in medicine. The expert roentgenologist should take rank as a consultant. He is a man who, by years of study and training, has prepared himself to render expert service. There is need for more experts in roentgenology, but by far the greatest demand is that the general practitioner shall possess such knowledge of roentgenology as will enable him to appreciate what a roentgenogram is, when it should be taken, in which conditions it is of value, and how it must be interpreted. It is not essential that he be familiar with the details of technic, but he should know the fundamental principles underlying the technic. To impart this knowledge must be the function of the undergraduate medical school, and the roentgenologists must be prepared to do this teaching.

The points to be considered, from the pedagogic as well as the roentgenologic side, are:

1. How many hours should be devoted to the teaching of roentgenology?
2. In which year should such teaching be done?
3. Should the course be required or elective?
4. Should roentgenology be placed in a department or division of its own, or in some other department or division?
5. What rank should the instructor have?

The catalogues of the 72 schools in Classes A and B of the Council on Medical Education of the American Medical Association were sent for. Sixty-three schools replied, and an investigation disclosed the following:

I. No statement as to the subject of roentgenology is made in the catalogues of 12 schools.

II. Representation on faculty (Clin. Prof. of R.), but no statement as to course, 1 school.

Dept. or Div. of Roentgenology	8 schools
A part of Medicine	9 schools
A part of Surgery	17 schools
A special subject	4 schools
A part of Electrology and Radiology	1 school
A part of X-ray Diagnosis and Electrotherapy	1 school
A part of Therap. and Roentg.	1 school

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As an answer to these queries, the following tables are of interest:

School	Department or Division	Title of Instructor	Hours	Years of Course	Required	Remarks
University of Alabama	Radiography	Instructor in Med. and Radiography	16	3	Yes	.....
University of Arkansas, Medical Department	.....	.....	...	...	....	.....
University of California	Surgery	.....	16	4	Yes	.....
Leland Stanford	Medicine	Asst. Prof. Med. and Director of Actinography	16	4	Yes	.....
University of Southern California	Medicine	Professor of Roentgenology	18	4	Yes	.....
Oakland College of Medicine	Medicine	.....	...	4	Yes	.....
Yale University	Surgery	Asst. Prof. Radiology	...	...	....	Series of lectures and dem.
Georgetown University	Electro-Therap. Surgery	Lecturer on Electro-Therap. and on Roentgenology	30	4	Yes	.....
Howard University	Electroth. and Radiography	Instructor in Electroth. and Radiography	32	2	Yes	Not separated
University of Georgia	.....	.....	.....	...	....	.....
Emory University	.....	.....	...	...	....	.....
Rush Medical College	Surgery.....	Lecturer of Radiology	32	3	Yes	.....
Hahnemann Medical College (Chicago)	Electrology and Radiology	Professor X-Rayology and Electrotherapeutics, and Associate Professor	12	3	Yes	.....
Chicago College of Medicine and Surgery	Div. Roentgenology	Professor of Roentgenology	16	3	Yes	.....
Bennet Medical College	.....	.....	...	...	....	.....
University of Illinois	Roentgenology	Instructor in Roentgenology	4	4	Yes	.....
Northwestern University	Roentgenology	Professor of Roentgenology	16	4	Yes	.....
Indiana University	Surgery	Prof. Dermatology and electrotherap.	17	4	Yes	.....
University of Iowa	.....	.....	...	...	....	.....
University of Louisville	Surgery	Instructor in Roentgenology	Not stated	...	....	.....
Tulane University	Medicine	Two instructors in Clin. Med. and Radiology	Not stated	2	Yes	.....
Bowdoin Medical School	Orthop. Surg.	.....	...	4	....	Part of ten hours' course
University of Maryland, College of Physicians and Surgeons	Surgery	Clin. Prof. Orth., Surg. and Roentgenology	30	4	Yes	Not separated
Johns Hopkins University	Surgery	Assoc. in Actinography	12	...	....	Graduate work
Harvard Medical School	Surgery	Assistant in Roentgenology	Not stated	4	Yes	In connection with all departments where such instruction is desired by head of individual dept.
Boston University	.....	.....	...	...	....	.....
Tufts College Medical School	Medicine	Assistant Professor of Roentgenology	12	4	Yes	.....
Detroit College of Medicine and Surgery	Div. Roentgenology	Professor of Roentgenology	16	3	Yes	.....
Michigan Homeopathic Medical School	Special Course R.	(?)	...	...	....	Hours to be appointed
University of Michigan	Roentgenology	Assoc. Prof. and Assistant in Roentgenology	16	4	Yes	.....
University of Minnesota	Elective Course	Instructor in Roentgenology	8	4	Elective	.....
St. Louis University	Surgery	Instructor in Radiography	(?)	(?)	(?)	.....
Washington University	.....	.....	Not stated	4	Yes	.....
University of Nebraska	Dermat. and Syphilology	Instructor in Derm. and X-ray Diag.	Not stated	3	Yes	Given as part of course on non-pharmacal therap.

School	Department or Division	Title of Instructor	Hours	Years of Course	Required	Remarks
Syracuse University	Surgery	Assoc. Prof., Orth. Surg. and Roentgenology	6	3 and 4	Yes	.....
University and Bellevue Hospital Medical College	Special Subject	Lecturer on Roentgenology	Not stated	4	Yes	.....
Columbia University	Dermatology	Instr. in Derm. and Syph.	12	3	Yes	Part of course in D. and S.
Albany Medical College	Surgery	Clin. Prof. Orth. Surg. and Roentgenology	...	4	Yes	.....
University of Buffalo.....	Surgery	Orthop. Surg.	...	4	Yes	.....
Fordham University	Physiologic Therap.	Professor of Phys. Ther.	(?)	(?)	(?)	Radiography and radiotherapy
Long Island College Hospital	Surgery Course V. Roentg.	.....	...	3	Yes	Series of lectures and demonstrations
Cornell University	Roentgenology	Professor and Assistant in Roentgenology	9	4	Yes	.....
Western Reserve University	Surgery	Demonstrator of Roentgenology	16	4	Elective	.....
University of Cincinnati	Mat.Med.,Pharm., and Therap.	Lect. and Demonst. of Radiology	16	4	Yes	Also a course in C. G.H. and Tub. Hosp., 40 hours
Ohio State University	Medicine and Electro-Ther.	Instructor in Roentgenology	9	3	Yes	.....
Eclectic Medical College (Cincinnati)	.....	.....	...	...	....	.....
University of Oklahoma	Medicine	Asst. Prof. Derm., Electro-Ther. and Radiog.	16	4	Yes	.....
University of Oregon	Medicine	Assoc. in Med.	32	4	Yes	Radiology and actinotherapy.
Hahnemann Medical College (Philadelphia)	Mat. Med. and Therap.	Lecturer on X-Ray and Photography	Not stated	3	Yes	.....
Woman's Medical College (Philadelphia)	.....	.....	.....	...	....	.....
Jefferson Medical College	.....	Clin. Prof. of Roentgenology	...	...	....	.....
University of Pennsylvania	Surgery	Prof. of Roentgenology	...	4	Yes	Series of lectures and demonstrations
Medico-Chirurgical (Philadelphia)	Separate Course	Professor of Roentgenology	34	4	Yes	.....
University of Pittsburgh	Department of Roentgenology	Professor of Roentgenology	...	...	....	.....
Medical College of South Carolina	Therap. and Roentgenology	Prof. Ther. and Roentg. and Asst. in M. M., Therap. and Roentgenology	30	3	Yes	.....
University of Tennessee	Medicine	Lect. on Roentgenology	8	4	Yes	.....
University of Texas, Department of Medicine	.....	.....	..	...	....	.....
Texas Christian University	X-ray, Diag. and Electro-Therapy	Prof. of Electrotherap.	10	4	Yes	.....
Baylor University College of Medicine	Surgery	Professor of Electro-Therapeutics	30	4	Yes	.....
University of Virginia.....	.....	.....	.....	....	....	.....
Medical College of Virginia	Roentgenology	Assoc. in Roentgenology	16	3	Yes	.....
McGill University	.....	.....	...	....	....	.....

A part of Radiography	1 school
A part of Electroth. and Radiography	1 school
A part of Physiologic Therapeutics	1 school
A part of Orthopedic Surgery	1 school
A part of Materia Medica and Therapeutics	1 school
A part of Pharmacology	1 school
A part of Dermatology	2 schools
III. Course Required	42 schools
Elective	2 schools
Work given as desired by various departments	1 school
Graduate work only	1 school
Not stated	4 schools
IV. Given in Senior year	29 schools
Given in Junior year	12 schools
Given in Sophomore year	2 schools
Not stated	7 schools
V. Hours devoted to subject:	
34	1 school
32	3 schools
30	4 schools
18	1 school
17	1 school
16	11 schools
12	4 schools
10	1 school
9	2 schools
8	2 schools
6	1 school
4	1 school
Not stated	18 schools
VI. Titles of Instructors:	
Prof. of Roentgenology	10 schools
Clin. Prof. of R.	1 school
Assoc. Prof. of R.	1 school
Asst. Prof. of R.	1 school
Lecturer on R.	3 schools
Associate in R.	1 school
Instructor in R.	5 schools
Demonstrator of R.	1 school
Assistant in R.	1 school
Lecturer in Radiology	2 schools
Lecturer on X-ray and Phototherapy	1 school
Associate in Actinography	1 school
Assistant Prof. of Radiology	1 school
Instructor in Radiography	1 school
Assistant in Surgery	1 school
Professor of X-rayology and Electrotherapeutics	1 school
Taught by Prof. of Orthopedic Surg.	1 school
Clin. Prof. of Orthop. Surg. and Roentgenology	2 schools
Assistant Prof. of Orthop. Surgery and Roentgenology	1 school
Asst. Prof. Med. and Director of Actinography	1 school
Prof. Therap. and Roentgenology	1 school
Instructor in Med. and Radiography	1 school
Instructor in Clin. Med. and Radiology	1 school
Associate in Medicine	1 school
Prof. of Electrotherapy	2 schools
Instructor in Dermatology and X-ray Diag.	1 school
Instructor in Dermatology and Syphilology	1 school
Asst. Prof. of Dermat., Electrotherapy and Radiography	1 school
Prof. of Dermat. and Electrotherapy	1 school
Assistant in Surgery	1 school
Not stated	5 schools

The conclusions which may be drawn from these statistics are by no means final, but they indicate clearly that the answers to the five questions asked above might well be as follows:

1. Sixteen hours.
2. Senior year.
3. Required.
4. Department or Division of Roentgenology.
5. Professor of Roentgenology.

I am convinced that the only one of these five answers to which any exception may be taken is the first. The model curriculum, prepared by the Council on Medical Education of the American Medical Association, recommends that forty-five hours be devoted to normal physical diagnosis and sixty hours to clinical or laboratory diagnosis. This does not include the use of the roentgen ray as a means of diagnosis.

On the basis of the great value of the roentgen ray as a diagnostic agent, a point disputed by no one, it would seem that sixteen hours is not enough time to devote to the teaching of that phase of roentgenology. The roentgen diagnosis of gastrointestinal and pulmonary lesions alone cannot be discussed adequately from the teaching standpoint in sixteen hours, and the discussion of the roentgen diagnosis of bone

and joint lesions, and the fundamental principles underlying the whole subject surely require almost as many more hours. But the normal relation of the subject to the curriculum, as a whole, and the fact that some teaching in this direction will be given in the departments of surgery and medicine must be taken cognizance of in arriving at a decision on this point. Then, too, there is the matter of roentgen therapy, a phase of the subject which is as yet in an unsettled state, but which should be talked of by an expert roentgenologist, for he and he only can impart the proper knowledge on that subject. Much discredit has been cast on roentgen therapy because of unfounded claims made by inexperienced and inadequately trained men. The medical student should be told what is the real value of the roentgen ray as a therapeutic agent. Its use should be restricted to those who have properly prepared themselves by postgraduate study and personal experience under the supervision of an expert.

It must be left to the teachers of roentgenology to outline a course of instruction and decide how many hours must be devoted to it. Personally, I feel that not more than twenty hours of actual didactic teaching should be done, and that coöperation with the clinician will give the additional time and opportunity to enlarge and round out the course. However, this matter can be decided only by careful consideration of every phase by the men most competent to do so—the teachers of roentgenology. Therefore, this paper is to be regarded not as in any sense final, but merely to call attention to the great need for making provision for adequate undergraduate instruction in roentgenology, which will be of value to the general practitioner as well as the specialist in medicine, and which will serve as a foundation for postgraduate work.

A SIMPLE METHOD FOR MARKING X-RAY PLATES

BY I. H. LEVY, M.D., SYRACUSE, N. Y.

DURING the past two years I have used a method for making *x*-ray plates that I have not seen described in the literature. Instead of using lead numbers, or a metallic plate marker, I take a small strip of firm tissue paper, and on it write with a medium lead pencil the patient's name, serial number, date, time of exposure in relation to the opaque meal, and any other data that I may desire. This slip is then placed (naturally in the dark room) between the intensifying screen and the plate. When the exposure is made, the writing is photographed on the negative. The advantages of this method are obvious. It is simple, requires no numbers or plate markers, the negatives are distinctly marked, and it is a decided advantage to have the patient's name, as well as serial number, etc., on every plate. Ink can be used for marking, but requires a strip of firmer paper. The method, however, is limited to plates taken with an intensifying screen.

SCOPE AND METHOD OF TEACHING ROENTGENOLOGY

BY DR. LEWIS GREGORY COLE, N. Y.

THERE is no one who has been a stronger advocate of the roentgenologist's being a pure specialist than myself. In accordance with this belief I gave up general practice ten years ago and limited myself to roentgenology, examining only those cases referred to me by the attending physician, making my report in writing to him, and never expressing an opinion to the patient except in the physician's presence.

During the early part of this period my attention, with that of other roentgenologists, was devoted to an attempt to make satisfactory roentgenograms, and with the various types of coils, interrupters, tubes, valve tubes, etc., this was a task of considerable magnitude. But thanks to the manufacturers one after another of these uncertainties has passed into history.

In the earlier days of the scientific study of disease the pathologist was an artist who by hand could cut the thinnest section of a specimen for microscopical study, and this art was of equal importance with the interpretation of the slide. But with the development of the microtome the section could be made by the non-medical laboratory assistant as rapidly as he cared to manipulate the instrument and with a thinness and conformity that the artist pathologist could never obtain.

As the microtome marked a new era in pathology, so with the Coolidge tube in roentgenology. Of a series of achievements in the development of apparatus this was the crowning point so simplifying the making of radiograms that even the non-medical laboratory assistant, who has been dignified with the name "technician," can, by following a formula of the manufacturer,—13 button, 23 m.a., and 5 in. gap—make radiograms surpassing in brilliancy and uniformity any result the artist roentgenologist could obtain with the old type of tube; and if he fails he has only to sign a slip enclosed for that purpose by the manufacturer, and his responsibility ceases.

Therefore, roentgenography, or the art of making radiograms, has been reduced practically to that of photography, while the science of roentgenology is in the interpretation of the roentgenograms, as applied to the diagnosis and prognosis of disease just as the science of pathology lies in the interpretation of the slide.

Roentgenography, the art of making roentgenograms, has been and will continue to be learned by non-medical assistants. They may learn it from the manufacturer of the apparatus, from the plate manufacturer, or from assisting a roentgenologist; or they may be fortunate enough to be taught the art from the ground up by Professor Shearer. The point is that the technicians have learned it in the past and will continue to learn it in the future. And we should all wish Professor Shearer God-speed in his undertaking.

At the mid-year meeting in Atlantic City last January there was much discussion as to the advisability of employing a technician, especially in hospital work. It seems to me there is no more objection to the making of the exposures by a technician than there is to the preparing of the patient and sterilizing of the instruments by a nurse; but the technician should not express an opinion as to what the radiogram shows any more than the nurse should express an opinion as to the diagnosis on a given case or as to whether surgery is indicated. The nurse may think she knows what is the

matter with the patient but, if well-trained, she will not for an instant consider offering a suggestion as to the diagnosis. The technician's usefulness and responsibility in the case are limited to the turning out of a good crisp roentgenogram.

It is therefore evident that what the roentgenologist has to teach is the science of interpreting roentgenograms, the application of the findings to the diagnosis and prognosis of diseases and the utilization of the roentgen ray in their treatment.

The instruction is of two grades: First, for the undergraduate, and second, for the post-graduate. Johnson's statement that roentgenology was born with a breech presentation was one of the truest of his many famous remarks and the fact of its being so produced probably accounts for the lack of undergraduate instruction in it. The amount of time devoted to roentgenology in medical colleges is absurdly small compared with the importance that the roentgen rays have achieved, there being scarcely a case, as we all know, in which the rays could not be used to advantage in the diagnosis, or differential diagnosis and prognosis of disease; and the day will come when as much time is devoted to roentgenology as is now given to the practice of medicine or surgery.

Unquestionably, this should be taught only to physicians and further than that, only to those physicians who have had a sufficient training in diagnosis and pathology to enable them to scientifically relate their roentgen findings to the pathological conditions which have caused them. It is perfectly true that some of the most able roentgenologists this country has produced have not been physicians. But their training in electrical engineering has been a tremendous aid in the development of apparatus and in the technique of radiography, more than compensating for what they have lacked in pathology and the practice of medicine. Yet these men are, I believe, the strongest advocates of limiting the practice of roentgenology to the medical profession.

At Cornell University Medical College the Department of Roentgenology has a Professorship and Associate. Two years ago only one lecture once a week during one semester was devoted to roentgenology. Last year there was one lecture a week during two semesters and this year we have one day a week during the entire senior year. This is of course entirely inadequate to cover the scope and accuracy of roentgen diagnosis. The limited time naturally does not permit the teaching of plate interpretation except as to demonstrate the scope and accuracy of the method. But if the faculty continue to increase the time devoted to the subject I hope to include in the course the practical application of roentgen interpretation. It was my practice last year to give two or three lectures on allied subjects with demonstration of roentgenograms, then to devote an hour to recapitulation, the students, this time, interpreting the roentgenograms which had been demonstrated during the previous two or three lectures. This I have found adds greatly to the interest of the students and enables the teacher to know whether he has made the demonstration clear.

Attempts were made last year to coöperate with other branches, particularly medicine, surgery, and gastro-enterostomy. The students together with the instructor in each department work out a case clinically, after which the case is radiographed to confirm or disprove the clinical diagnosis. This serves as a remarkable means of demonstrating to the students the value and accuracy of roentgen diagnosis and in the coming year I hope to develop this plan to a considerable degree.

I have found that it is by individual work with physicians or students that one can accomplish most in proclaiming the truths of roentgenology. For the present we must

be content with teaching the scope and accuracy of the roentgenological method and trust that eventually sufficient time will be allowed in which to cover the art of roentgenography and the science of roentgen interpretation.

The question of post-graduate instruction is still more serious. The time was,—in fact, it has not altogether passed—when a man by buying an *x*-ray machine could pass as a roentgenologist. Now, some of them feel the necessity of training but they expect to get sufficient instruction in two or three weeks to make them expert. Medical literature is flooded with the accomplishments of roentgenologists of recognized standing who have worked five or ten years on certain subjects and the general medical practitioner demands of his roentgenologist that he accomplish these same results. Thus, in many instances unexperienced men attempt to make roentgen diagnosis of which they know practically nothing, the result being gross roentgenological errors.

Along with this group are the specialists in other lines of medicine who, reading the signs of the times in the demands of their patients, are installing *x*-ray machines and making roentgenological examinations. A few of these men are more or less prepared, usually by a six-weeks' course with some of our German or Austrian professors. They say to their patients, "I will make an *x*-ray examination without charge as part of my procedure." Their competitors then feel compelled to install an *x*-ray machine and although some of them do not know one end of the tube from the other, they make the same statement. Knowing nothing of the interpretation of roentgen findings, they therefore make the diagnosis as of old from the clinical symptoms and read into the fluoroscopic or roentgenographic examination any diagnosis that they see fit, without interference on the part of the troublesome roentgenologist. All of these facts but confirm my belief that there is a constantly growing demand on the part of the patient for the benefit of *x*-ray diagnosis and coincidentally a desire on the part of the physician to increase his efficiency by the ability to read this additional corroborative evidence.

For those post-graduates who come to the laboratory for study we have a large number of reports on file, grouped first according to illustrative findings of normal conditions, then to lesions, then according to confirmation of diagnosis. These reports include clinical history, roentgen findings, and where obtained, subsequent history of result of operation. The post-graduate student can by this means compare these reports with the complete set of radiograms taken in each case. He may thus work out problems from cases on file in the same way as we have shown the undergraduate student doing in his course of study.

But the post-graduate student may bring to this work the accumulation of years of experience and observation, thus enabling him if he come with open mind to grasp the characteristic relationship between the clinical symptoms and roentgen findings. And this experience, if it does not make him at once a trained roentgenologist, may serve the purpose of disseminating the belief that the work of the roentgenologist is necessary to the perfect efficiency of the physician in his diagnosis, and so to bring about a greater measure of coöperation between these two branches of the medical profession.

EXPERIENCES IN ROENTGENOLOGIC TEACHING

BY HENRY K. PANCOAST, M.D., PHILADELPHIA

IT was the intention of the author to merely take part in the discussion on teaching of roentgenology, but as a definite subject for a paper was assigned, an endeavor will be made to present some personal experiences in teaching this specialty, and to show the attitude of undergraduate students, members of a faculty, and a roentgenologist toward the introduction of a course on roentgenology into the curriculum of a medical school.

The teaching of this subject may be divided according to two groups of students into undergraduate and post-graduate instruction. At the present time, all that we may hope to accomplish in the too short and overcrowded years of the undergraduate student is to teach him the value of roentgen diagnosis and therapy and the extent of their application, on the one hand, and on the other, to give him such an insight into roentgenology as a specialty that he may be able to decide, after graduation, whether or not he may wish to take it up as a life work. The undergradute student is not capable, as a rule, of selecting the specialty he is to follow later. After his graduation and hospital experience, if he then wishes to take up roentgenology, he should be able to meet the requirements of its practice by taking a suitable post-graduate course under the instruction of one or more experienced roentgenologists or by acting as an assistant to one.

Of the two branches of teaching, post-graduate instruction is the less important for general discussion. We may dismiss the subject by giving a résumé of the course pursued by a group of roentgenologists of which the author is a member. This corps of instructors is composed of six men who offer a course of instruction to not more than six graduates in medicine at one time. Each course covers a period of four weeks with a roster arranged to occupy six hours of actual work daily. The students receive didactic instruction, study cases and interpret plates, and see the instructor work. In order to avoid monotony to the students and to the roentgenologist and to minimize the interference with his regular work, the class spends only about one and one-half hours with each instructor each day. If more than this, the work is divided up in more than two places. The teaching is done in six hospitals and two private offices. Each instructor is responsible for certain definite branches of roentgenology, so that the entire subject is fully covered, including the physics of roentgenology, the principles of technic and dark-room work. This plan is far more profitable to the student than a course given by any one man, for he sees more in a given time, is shown a greater variety of work, and observes the same end results obtained frequently through widely different procedures. Such a course serves as simply a groundwork upon which the student may become a roentgenologist later.

At the present time our interest seems to be centered mainly around the discussion of the best methods of teaching roentgenology to undergraduates in medical schools. All of us are anxious, on the one hand, to receive the full recognition due us as experts in a specialty that is interwoven with every branch of medicine, and on the other, we are just as desirous that the students should be taught to realize the full importance of roentgenology in its connection with every other branch. It is probable, however, that there is a tendency on our part for our ambitions to exceed in many instances what is in the power of medical schools to gratify

without curtailing the teachers of other important subjects. We are apt to lose sight of the fact that in very recent years due credit is given our own work by the importance that is placed upon the roentgen examination as a means of diagnosis. Internists and surgeons are now beginning to teach that the most reliable means of diagnosis of gastric carcinoma or ulcer, or of duodenal ulcer is the roentgen examination. The student is now taught this by the professor of medicine or surgery and the day has arrived when the roentgenologist is given due credit for his ability because he has proven himself able to give results worth recognition. Our task lies now more in the line of teaching how our results are accomplished.

As a worker in such an important branch, both roentgenology and the roentgenologist should be given the recognition they deserve, and the roentgenologist who is any credit to a teaching institution is deserving of the title of a professor, or at least an assistant or associate professor.

When a course in roentgenology is being instituted, both roentgenologist and students are apt to be over-enthusiastic in the amount of instruction that is needed. It is natural for the former to grasp all the time that can possibly be allotted to him and ask for more, which creates a bad impression among other members of the faculty. In the beginning, it is far better for him to obtain a reasonable number of hours, and then prove by his work that it merits more time. If the matter is put before students, they invariably become enthusiastic for something new that may prove attractive and are quite ready to drop some subject that seems unattractive. Those who work with students soon realize that their ideas are subject to extreme variations. Third and fourth year students soon find that they do not have to attend lectures on roentgenology, and as soon as their interest in something new begins to lag in the least, they begin to stay away from a long series of lectures on the subject. A final examination becomes the only means of holding them, and this is not always practicable.

Our method of teaching when first instituted comprised a few general lectures and in addition roentgenology was made a minor elective. The few lectures were well attended and the elective class was comparatively large, but it gradually dwindled as the students began to realize that this was more a post-graduate than an under-graduate course. It was abandoned for this reason and also because some of those who continued would later claim that they had taken a full course of instruction under a roentgenologist when applying for a position in an institution.

Our present method seems more attractive to the student and is certainly less monotonous. A series of general lectures is given once or twice a week.

In addition, the whole subject from the diagnostic and therapeutic standpoint is covered as nearly as is possible, but an attempt is made to combine *some* of the lectures with those of other teachers. For instance, after the professor of surgery has finished his series of lectures on fractures, one or two hours are devoted by the roentgenologist to a study of fractures from the roentgen standpoint. Various other subjects are taken up in the same way. Such a method certainly is devoid of monotony to the student, and following such a procedure, we have been able to enlarge upon our course from year to year. At the present time it is our object to work up to about fifteen lectures each year.

In connection with such didactic teaching, we have found the case method as suggested by Dr. Percy Brown last year to be of considerable value, and to interest the students.

We must bear in mind that we are not teaching undergraduates to become roentgenologists, and we must not give them any

reason to believe that a short course of instruction such as it is possible for us to give can render them capable of practicing roentgenology. Nevertheless, our course must be somewhat comprehensive for the reason that there are always one or more men in a graduating class who are going to practice in small communities far removed from towns or cities where there are roentgenologists, or are going to try and convert the heathen, and for some of these men it will be necessary to purchase small *x*-ray equipments with which to make minor examinations just as they must practice every other branch of medicine without adequate preparation. These men must make their own experience without help, but it is our duty to help them all we can with the best possible amount of didactic teaching, but without taking more than our share of time from other teachers. Truly, good teachers are wanted in roentgenology, and the better they are the more time will be allotted to them.

DISCUSSION ON THE PAPERS OF DRS. ZAPFFE, COLE AND PANCOAST

Dr. F. H. Baetjer, Baltimore, Md.: Mr. Chairman: I agree in the main with what Dr. Zapffe said; at the same time, the point Dr. Pancoast brought out, that of correlation of roentgenology with other branches, is very important. I think that we are rather prone to magnify the importance of this subject when in reality it ought to come under the head of a minor specialty. Surgery, medicine, gynecology and obstetrics are major subjects, and everything else is pretty well to be considered a minor subject. Most of us could not give enough time to teaching to make the number of hours of actual instruction in the class very great. Dr. Zapffe's remark about getting the proper recognition for our specialty is a most important one. Dr. Pancoast probably answered that in his paper. In the institution with which I am connected I am primarily a surgical roentgenologist; that is, I am on the surgical staff, and while I do not teach roentgenology from the standpoint of surgery alone, yet I am attached to that department. We divide our teaching into two parts, post-graduate and under-graduate. The course in surgery is so arranged that it embraces genito-urinary surgery, orthopedic surgery, and surgery of the nervous system, with roentgenology included. One morning a week, one hour, is assigned to the subject, and attendance is required throughout the entire course. The work is scheduled for the fourth or Senior year. We do not discuss the question of technic at all. We assume that the men are taking a generalized course in medicine, and what they should know is the value of roentgenology as applied to medicine. They are not interested in technic. If any of these men want to become roentgenologists, the course is insufficient, and they will have to take a special course of instruction in which more attention is given to technic. We do speak of the physics of the *x*-ray, of the apparatus that is used in this work, what the different degrees of penetration are, but only a very short time is given to that phase of the subject. The remainder of the course is given entirely from the standpoint of practical work. I make the student the teacher, while I am the listener. We give them normal cases to look at before we take up any of the pathological conditions. There is no lecture work. It is a demonstration course. After they have become familiar with plates and shadows, we take up pathological subjects. We announce, for instance, that the following week we will take up the subject of fractures. We do not read the history

of any case; we set up the plates, and then ask a student to tell us what he sees; what he thinks is not normal; what information he can derive from the plate, such as the age of the patient, judging by the texture of the bones. In a recent fracture there is no atrophy of bones; in old fractures there is. We attempt to bring that out in every case. The student can determine whether union has taken place or not; in fact, we try to construct a history on the basis of what we see in the plate, and to determine what is the condition of the patient at that particular time. We take up all types of fractures and dislocations. Very little talking is done in the way of lecturing, and the student is trained to develop his powers of observation. We simply guide him along, giving help only when help is needed. We take up the subject of joint diseases, bone tumors, and so forth, in the same way, trying to cover as much ground as we can with greatest benefit to the student. We always keep the teaching in line with medical work in general, and not with the idea of impressing the student that roentgenology is a specifically individual subject. The department of roentgenology does not give any examinations. The other departments, such as medicine and surgery, always bring in cases in which roentgenograms have been made, and the student must interpret them, so that roentgenology comes in as a part of medicine, not as a special subject. In that way we believe that we give the student a fairly intelligent and comprehensive conception of this subject; what it is, what it will do, and how it can be made use of to best advantage. As Dr. Pancoast said, if these men are so situated in practice that they cannot get the services of a trained roentgenologist, they can at least get a glimmering of what roentgenology is, and a fair interpretation as to what is the matter with the patient. If you are so situated that you can get the services of a trained roentgenologist, get him, and rely on his interpretation.

As to post-graduate teaching,—that, too, is practical. I try to limit the classes to two or three students. They are brought into the laboratory at nine o'clock in the morning, and remain there until five o'clock. They see the examinations made, see the methods used, how plates are developed, what makes for success and why we get failures. For one hour every day we have a conference, and all the work done on the preceding day is discussed. Lectures are not given at all. In that way the men are thrown on their own resources to a great extent, and must train themselves to do this work, under the direction of someone who knows how to do it. We never get the history of a patient. We always try to see how nearly we can come to making a roentgenologic diagnosis without the aid of a clinical history. My position is that the patient is sent to you not for the purpose of making a medical or surgical diagnosis, but for you to contribute what you can to the diagnosis by roentgenologic examination. If you are examining a bacteriologic slide microscopically and see the malarial organism, you do not need a history to make a diagnosis. The same is true of a slide showing tubercle bacilli. We ought to be able to furnish much information with regard to the diagnosis as well as the history. We can check up on our findings by comparing and correlating them with the clinical findings.

Unfortunately, our time is entirely too short for thorough post-graduate teaching. A man should spend from six to eight months at least in daily study and I wish he could stay longer. In our work, after the student has seen the examination made, he goes with one of the assistants and makes examinations under his direction. We let him develop a plate, and get his own diagnosis. If we disagree with him, we argue the case with him in order to arrive at a solution of the problem. Our aim is to make it all as practical as possible. Roentgenology can never be taught by a course of lectures. The thing to do in under-graduate work is not to instruct in matters of

technic, but to teach interpretation. If we are of any value at all as teachers, it should be from the standpoint of medicine, and not from the standpoint of skilled technicians.

Dr. Kennon Dunham, Cincinnati: Only a few points occur to me after listening to these excellent papers. As you can see, the teaching is being done by men well qualified to do it. It is a matter of putting intelligence behind the teaching. That applies to all medical teaching, and with roentgenology it is a case of medical pedagogy all over again, with special attention being given to the clinical side of the work. What are we trying to do in our teaching of roentgenology? Are we trying to impress on the student, whether post-graduate or under-graduate, the value of the subject, or the importance of the teacher? It is a very easy matter for us to drop into that horrible mistake of teaching roentgenology by means of lectures. The fundamental purpose of this teaching, I think, should be to give the student the ability to read the roentgen literature, and to realize that roentgenology is a part of medicine. He should be able to read roentgen literature intelligently, and to derive benefit from such reading. To do this we should be prepared not to teach matters of technic, but to bring out the fundamental science underlying this work. How many of our students know anything at all about Ohms' law? How many know what an ampere is? How many know anything at all about the units of electrical measurement? Such knowledge is absolutely necessary. Fundamental principles should be taught somewhere, in order that these students may understand that which is to follow.

As to the year of the course in which roentgenology should be taught, I believe that the third year is the best, because then we can touch on these fundamentals, and in the fourth year we can take up the practical side of the subject, so that the students can put to use the knowledge which they have gained in the third year. As to the number of hours, they should be as many as the instructor can fill and the faculty can apportion to him. We must not feel that we are the arbiters, because roentgenology is only a part, a small part, of the entire curriculum.

Dr. A. M. Cole, Indianapolis: Certain facts appealed to me particularly during the reading of these papers, because I have been a teacher of under-graduates. To one point especially do I want to call attention, and that is the tendency to talk over the student's head. This work must be made simple as well as practical. During my first year at teaching I was assigned twenty-four hours in which I tried to cover the entire subject. I accomplished little. The next year I devoted less time to theory and more to practical work. That plan proved more successful. I tried to teach the students that the roentgen rays are good for certain things and not good for others. I followed the plan Dr. Baetjer described.

There is a crying need for teaching along this line, not only to under-graduates but also to practitioners. Hardly a week passes that I do not hear from men who want to learn roentgenology and to know where they can get adequate instruction. Until the past year or so I have not known what to say to these men. I could not take them into my office, and I could not refer them to any school, or to any men who were giving post-graduate instruction. Without any instruction in this subject there are a large number of what might be termed half-baked roentgenologists starting up all over the country. This is largely the fault of the manufacturers, who induce them to buy apparatus because, as they say, it is so easy to learn how to make a picture. They do not say anything about the difficulties of interpretation, because their sole object is to make sales. The consequence is that these doctors become convinced that they can learn to be roentgenologists by putting a plate under the patient and turning a switch which starts the apparatus to work. They

soon learn their error and wish to take post-graduate work. It is only during the last year or so that such instruction has been available. The time must come when all first class medical schools will be compelled to accord this subject its rightful place in the medical curriculum.

Dr. Wm. H. Dieffenbach, New York City: I have been teaching this subject for about fifteen years. It is of such a character that no student can appreciate it properly until he reaches his Senior year. It is a mistake to teach this subject to Juniors or Sophomores. I believe that when a fifth year is added to the medical course, it will be the best year in which to give this teaching.

I want to take exception to Dr. Zapffe's statement that sixteen hours is enough time to give to the teaching of roentgenology. We should not give less than thirty-six hours, and I feel that sixty-four hours is just about the right time to allot to it. The time should be divided between lectures and laboratory work. My method of procedure is to give a didactic lecture and follow same with practical laboratory demonstrations. The didactic lecture enables the student to take important notes which are difficult in laboratory work and the lantern-slides shown at the lecture assist in fixing the salient points in the mind of the student.

Dr. Frederick H. Baetjer, Baltimore: I neglected to speak on the point as to what year this subject should be taught. I think it is a mistake to teach it in any except the final year of the course. I agree with Dr. Dieffenbach, that if a fifth year is added that is the time to teach roentgenology. In order to get an intelligent conception of the work, the student must have seen the case from the clinical side. Then he will know what he is looking for. I do not attempt to teach the students how to make a diagnosis, but I do aim to have them recognize that there is something wrong, and to tell what that something is, so that they can call in someone to help make the diagnosis.

As to lectures and laboratory methods, why take up any of the limited time at our disposal by talking about things that can be found in books?

Dr. George C. Johnston, Pittsburgh: The University of Pittsburgh has a department of roentgenology in charge of a full professor. The instruction is given to the third year students, because the fourth year students are worked so hard to pass the State Board examinations that they do not have time to take up the real work of medicine. They must pass the State Board first and practice afterward. We can tell them in a few minutes what it takes them hours to read. We give them certain didactic instruction and then take them into the laboratory and show them how the thing is done. The students come to my office, and they take enough interest in this work so that I do not need to call the roll to see whether they are there. They come in sections. We make dummy examinations of every part of the body, for every condition I can think of, so that the moment they look at a roentgenogram they know the path of the light rays from the tube through the part to the plate. That is a great help in interpretation of plates. We also teach them something about interpretation. Of course, this is a large subject, but we do the best we can with it.

In the matter of localization of foreign bodies in the eye, the technic for the production of the roentgenogram is explained to them. Of course, the same subject is discussed by the professor of ophthalmology, and other teachers doubtless do the same, so that much teaching of roentgenology is done by other men, each of whom is competent to impart certain instruction along certain lines.

Dr. Fred C. Zapffe, of Chicago (closing the discussion on his part): It was not my purpose to tell roentgenologists how to teach their subject. I desired merely to call attention to the necessity for formulating a definite plan for instruction in roentgen-

ology to under-graduate students. When this is done, the teaching will be made effective and practical, and will serve as a basis for post-graduate work. No one man can evolve a plan for teaching roentgenology, but there are now enough specialists in roentgenology who are engaged in teaching in under-graduate schools, and who have taught for a sufficient length of time to be able to work out a plan which may be submitted to this Society for approval, and which will serve as a model for under-graduate instruction in medical schools. It must be remembered, however, that such a plan must be based on pedagogic principles. It is impossible to make specialists of under-graduate students. Enough time is not available to teach all that is known of roentgenology, but there is agreement on one point, namely, that every graduate from a medical school should have such knowledge of roentgenology as will enable him to make proper use of the work in his everyday practice. Sixteen hours may not be enough time to give to the subject, but sixty-four hours certainly is entirely too much. As Dr. Baetjer stated, this must be regarded a minor subject, and as a part of the whole medical curriculum it can be given only its own percentage of hours of the total schedule. If sixty-four hours were to be allotted, then general medicine would have to be given about two thousand hours. The average number of hours for the full course is four thousand, and surely no one will say that roentgenology is entitled to sixty-four of these hours; that is, one and five-tenths per cent. That is only one phase of the subject that should be considered. But it is an important one. There is only one way to dispose of this matter, and that is to place the solution of the problem, the working out of the plan of teaching, in the hands of a committee of teaching roentgenologists. (Here Dr. Zapffe moved the appointment of a committee of five, which will formulate a plan for teaching roentgenology to under-graduate medical students. The committee appointed consists of Drs. Baetjer, Pancoast, L. G. Cole, Caldwell, and Brown.)

Dr. L. G. Cole, New York City (closing the discussion on his part): There seems to be a difference of opinion as to what is meant by "didactic instruction" in roentgenology. The only didactic instruction we give is direct interpretation of the roentgenogram or the lantern slide.

A student will of course learn something from a plate given him to work out independently but in the limited time at his disposal he will see only a few plates, and be able to clear up but few problems. The examination of the roentgenogram for interpretation is similar to the interpretation of the physical signs, and should by no means be termed "didactic instruction." There is no need for didactic lectures in the broad sense of that term, but time can rather be gained by telling the student what in the plate is important for him to see, and then helping him to see it.

Dr. H. K. Pancoast, Philadelphia (closing the discussion): After all that has been said in the discussion of this subject many men will leave here under the impression that roentgenologic teaching must be given solely in the form of didactic lectures, but such is not the case. It is essential to devote a few hours to technical lectures upon roentgenology in general, but the greater part of the teaching of diagnostic work must be done in connection with plates or slides. For example, didactic lectures on the gastro-intestinal tract, unless fully illustrated, will be of no value to the student. He will forget what is said to him or will probably fail to attend. What is on the plate must be explained to him, and he must be told the reason for any abnormal appearance present. A part of the hour may then be used to advantage by having the students attempt to interpret roentgenograms of various cases.

REPORT ON THREE INTERESTING HEAD LESIONS

BY ARIAL W. GEORGE, M.D., BOSTON

THESE three cases are reported, as they offer one or two interesting facts from a roentgen point of view.

Case I illustrates two important facts in the study of lesions of the brain and of the bones of the skull. *First,* that under certain conditions we have in the roentgen plates very definite indirect manifestations of lesions, not only of the brain, but diseases of the dura mater. *Second,* that with the direct evidence of a lesion of the skull we may find confirmation of the lesion by other indirect manifestations.

Case I; Plates I-II; patient, Mrs. E. S.; referred by A. J. A. Hamilton, M.D., Boston; roentgen examination October 26, 1914.

Roentgen Conclusions.—The plates were made anteroposteriorly and show very definite bone thickening of the outer and inner table of the skull in the right temporal region. (Plate II.) If this plate is compared with the one of the left the dense bony change will be noted. Plates made laterally show marked dilatation of the bony groove of the anterior branch of the middle meningeal artery which suggests intracranial pressure. In view of this fact that the dilatation was in the region of the suspected lesion it became of importance in the roentgen diagnosis (Plate I). Compare in Plate I the dilated groove (A) with the groove of the middle meningeal artery (B). It was suggested that, owing to this dilatation, further investigation by surgical means should be considered.

I am indebted to Harvey Cushing, M.D., of the Peter Bent Brigham Hospital for an abstract of their records.

Mrs. S. was admitted to the hospital October 27 to October 29, and again November 2 to November 29, 1914. Occupation, housewife. Family history unimportant. Two years previously the patient had noticed a small bony growth at the right temple. This gradually increased in size. Dr. Gile of Hanover, N. H., performed an operation in 1914. He removed a small bony growth which was considered benign. Since the operation there has been a return of symptoms and the patient thought the growth was recurring. There was very little pain or nausea or visual disturbances. There was found on examination a scar, three centimeters in length, in the right temporal region, with bony growth beneath the scar. Pupils, the right larger than the left, but both react. Vision normal. Wassermann test negative. Dr. Harvey Cushing operated. The underlying dura was cut away and the under surfaces showed deposits of irregular formation. Pathological report: Dura endothelioma. The convalescence was uneventful. The patient was discharged well, November 29, 1914.

Case II; Plate III; patient, Mr. E. S. B., age 23; referred by W. E. Cowles, MD., Boston, December 23, 1914. Stereoscopic plates of the head made in the lateral position. Posterior to the sella turcica, the plates show an area about three centimeters in diameter, with apparent calcified walls (Plate III). This mass was considered external and accessible.

Previous to the roentgen examination, the patient had entered the Peter Bent Brigham

PLATE I. Case I.

PLATE II. Case I.

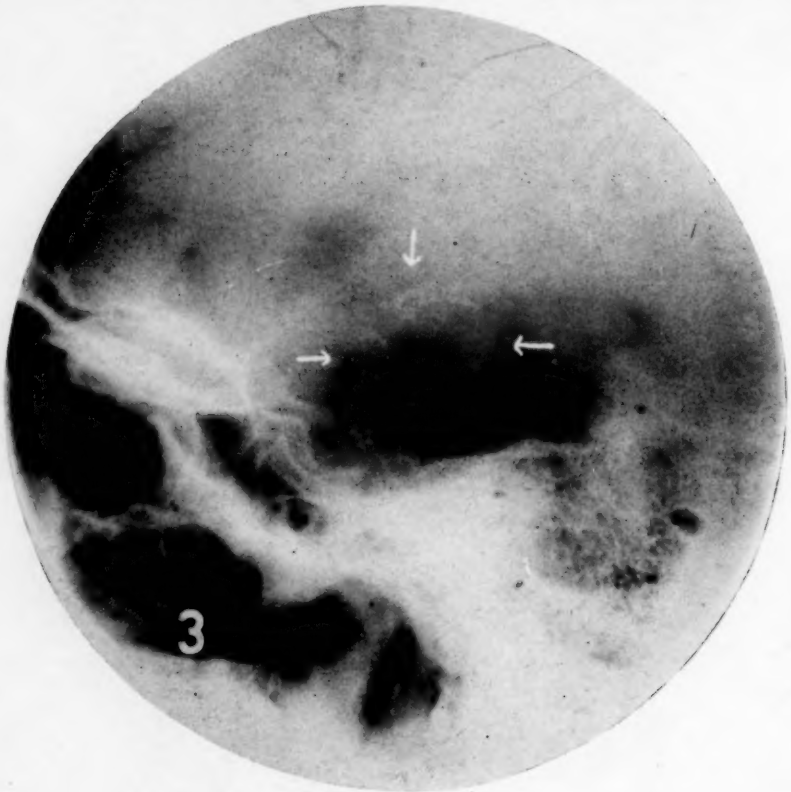

PLATE III. Case II.

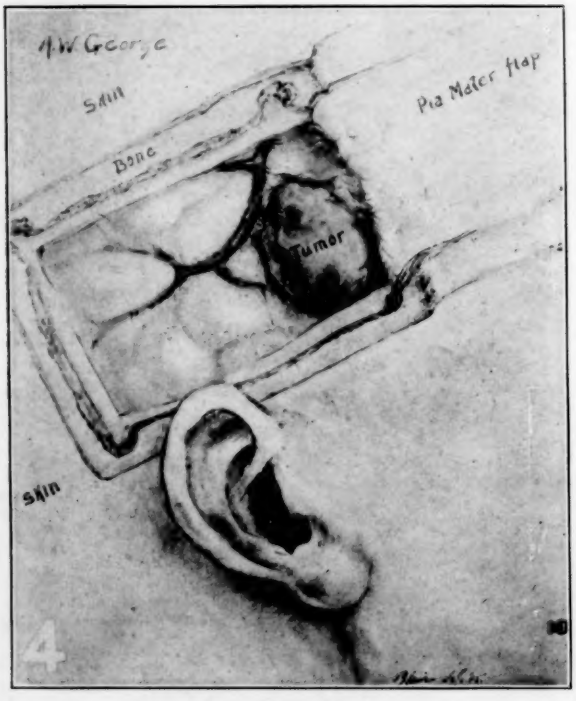

PLATE IV. Case II.

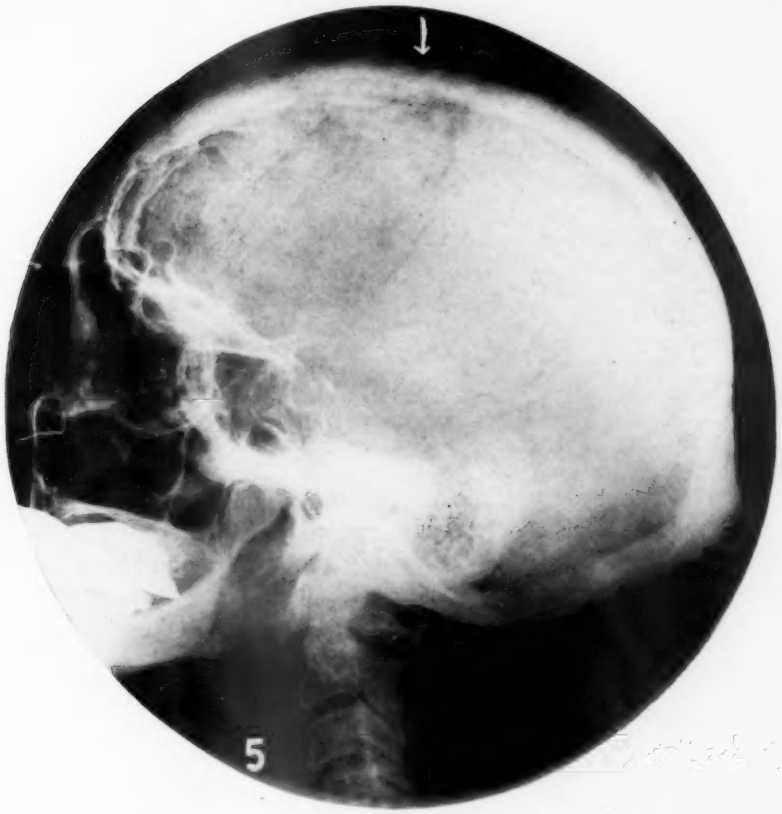

PLATE V. Case III.

Hospital during the spring of 1914. I am indebted to Dr. Cushing for the brief synopsis of their records.

Past history: In the fall of 1907 he was injured about the head playing football. He was kicked twice after that. The first time he was unconscious for twenty minutes and the second time for three or four minutes. There was no evidence of contusion. Epileptic form of attack began about eighteen months before admittance to the Hospital. Attacks began to appear about every two weeks, then every day. During these attacks the patient became unconscious and has been told that he assumed unusual postures. For example, holding his hand in the air for an hour at a time. Objective findings, linear scar on left eyebrow, some disturbance of memory, history of convulsions and twitchings. Entered the Hospital May 28, 1914. Was kept under observation for two weeks; when discharged, was advised to keep track of attacks and to return to the Hospital for further observation in the course of two or three months. He did not return.

The patient was operated upon by Drs. Cole and Kimpton at the Hart Hospital, December 29, 1914. At this time it was noted that his speech was disconnected and his memory poor. The operation showed a small tumor situated just below the pia mater and adherent to the midfrontal lobe. The surgical diagnosis: encapsulated glioma (Plate IV). (The drawing was made in the operating room, and is only diagrammatic, and does not illustrate the technique of the operation.) The patient made a good recovery from the operation, and for a time was free from the previous symptoms, but

in the past few months there has been a return of the old symptoms.

Case III; Plate V. The lateral view of the whole skull of a woman fifty years of age which shows a luetic involvement of the bones of the skull. This is characterized in the roentgen plate by absorption and irregular bone formation about the outer and inner tables, especially of the frontal and temporal bones.

History: loss of hair, tenderness, and continued pain. Positive Wassermann. *Roentgen Conclusions:* Probably luetic involvement of the bones of the skull.

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OBSERVATIONS ON GASTRO-INTESTINAL LESIONS, BASED ON ONE HUNDRED CASES IN WHICH THE ROENTGENOLOGIST WAS PRESENT AT THE OPERATION

BY LEON THEODORE LE WALD, M.D., NEW YORK CITY

RECENTLY a statement was published to the effect that the percentage of correct clinical diagnoses in a large public hospital was only fifty per cent., as borne out by postmortem findings.[1]

I have not had the opportunity of going over these statistics, but from personal recollection of several thousand postmortem examinations performed there, the percentage would appear to be not far from correct.

Time and again attending physicians present at autopsies on cases which they had studied for weeks, months or years in the hospital would find themselves wrong at the autopsy. A favorite remark of a teacher and master in physical diagnosis was, "It all goes to show that physical signs are not worth anything under certain conditions." So true was this, that a *correct* clinical diagnosis was always a thing which brought out comment. Many times a differential diagnosis between a pneumonia and an empyema was only made at the autopsy.

One case in particular made a lasting impression upon the writer. It was a case of lobar pneumonia in a man who had complete transposition of all his viscera. The records showed that this man was examined repeatedly by all the ordinary methods of percussion, palpation and auscultation, yet it was never even *suspected* that he had his heart on his *right* side and his liver on his *left* side. Such errors are still being made to-day and will continue to be made until a roentgen examination, by a competent roentgenologist, is made a part of *every* routine physical examination of patients, and of applicants for entrance into the army, navy and other state positions, and of applicants for life insurance, and also before the admission of patients to tuberculosis sanitaria.[2] Many are the cases that the writer has examined *after* their admittance to a tuberculosis sanitarium and found *no* evidence of pulmonary tuberculosis. One patient (who was fortunate enough to *escape* being sent to a sanitarium) said to me that he was all run down and in a very susceptible condition to contract tuberculosis, especially if placed in close contact with it in a sanitarium, but that he was sure he did not have it. Time has shown that his own diagnosis was the correct one.

To come more directly to our special field of study, what can we say as to the correctness of the clinical diagnosis?

How many cases are being treated for supposed "gastric neurosis" and "indigestion" who really are suffering from ulcer of the stomach or duodenum?

[1] Horst Oertel: Russell Sage Foundation; Report on Postmortem Examinations in the U. S. J. A. M. A., Vol. LX, No. 23, June 7, 1913, and Cabot, Richard C.: Diagnostic Pitfalls Identified During a Study of 3,000 Autopsies. J. A. M. A., Dec. 28, 1912, p. 2295.

[2] Ash: The Pathology of the Mistaken Diagnoses in a Hospital for Advanced Tuberculosis. J. A. M. A., Vol. LXIV, No. 1.

How many cases are being operated upon for supposed "chronic appendicitis" who really have a ptosed, water-trap, residual stomach?

How many cases are being operated upon for gall-stones who have no gall-stones?

How many cases are being treated for so-called "atonic constipation" who have sigmoid flexures three times normal in length?

How many cases are being treated for so-called "chronic colitis" who have diverticulitis?

How many cases are being treated for so-called "dyspepsia" who have carcinoma of the stomach; or a ureteral calculus?

How many cases are being treated for so-called "intestinal indigestion" who have a carcinoma of the colon?

But what have we to offer besides criticism? Foolish indeed is he to criticize who cannot offer a substitute or remedy for an evil.

We have much to offer in favor of roentgen diagnosis. Indeed, we are ourselves surprised in going over our statistics to find the high percentage of roentgen diagnoses confirmed at operation. A patient may now at least go to the operating table with a correct diagnosis in nearly every case.

In the words of Leonard: "The progress of the past five years has influenced medical and surgical opinion until a roentgen examination is considered a *sine qua non* before operation." But in spite of these established facts many are the physicians and surgeons who are not living up to this high standard. It therefore is necessary for us all to place our data on record in order that the correctness of roentgen diagnosis in the gastro-intestinal tract shall be taken at its true value—namely, between eighty-five and ninety-five per cent.

The following illustrations are all from cases personally observed at operation.[3] The pathological findings were recorded at the time of operation and in nearly every instance the case was again studied roentgenologically *subsequent* to operation in order to test out the functional results after operation and to determine whether symptoms had been actually relieved.

In no case was there any cause to regret that the operation had been advised.

In two cases in which operation was *not* advised, operation was performed nevertheless and no operative lesion found, thus bearing out the value of *negative* roentgen findings in certain cases.

The roentgenologist after determining the organic nature of a lesion, such as hour-glass deformity of the stomach, should not rest there. He must go further, he must determine the exact size and shape of each pouch, the time it takes each pouch to empty, whether or not any other lesion, such as ulcer, is present in some other part of the stomach or duodenum, and he must ascertain the condition of the remainder of the digestive tract. On the accuracy of his findings, the kind and extent of operative procedure will largely depend.

If he has overlooked a pyloric stenosis (even though it be only spasmodic) and the surgeon performs only a gastro-gastrostomy, instead of a gastro-enterostomy, the result will not be a complete cure. Likewise, if the surgeon operates without a complete roentgen examination having been made, or without due consideration of all aspects of the findings, the best results may not be obtained.

In fact, the closest coöperation between the roentgenologist and the operator is essential to the securing of the best results to the patient. It is even wise, if possible, for the roentgenologist to be present at the operation, in order that his opinion may be obtained on doubtful points which may arise in complicated cases during the course of the operation.

[3] Read at the annual meeting of A. R. R. S., Cleveland, Ohio, Sept., 1914, and illustrated by lantern slides.

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EDITORIAL

The national topic of "preparedness" has aroused the patriotism of many classes of citizens. Business men are founding companies with camps for drill and study in the problems of national defense: automobile owners are perfecting plans which will provide the government with greatly augmented facilities for transportation, motor boat enthusiasts are planning similar patriotic organizations. It would be fitting for the roentgenologists of the United States to consider how their services could be proffered to the government to the best advantage. Preparation for war is the ability to utilize on the shortest notice the trained men of the country. If all the departments of defense are manned by trained individuals, the result is efficiency. If the base and field hospitals are to share in this efficiency, the personnel of the medical corps must be trained in all its branches before it is called into service. It would be timely for the medical department at Washington to consider the problems of military roentgenology and to enlist the services of the experts in our specialty so that if there arose occasion for their work, they would have had the necessary supplemental training and experience to make them really efficient. The severe problems of working rapidly with transportable outfits, rapid localization for immediate surgical interference, the economical administration over supplies and help can only be faced properly if the roentgen department of the medical service is in a state of "preparedness." We feel sure that any step in this direction by the Surgeon General would meet with the most *hearty* response.

We heard recently of a new medical society whose membership it is feared will be quite small. The sole qualification is that the members will never present at its sessions any papers which have been read or published before.

A recent automobile motor is constructed practically entirely of aluminum. However, while the surgeon is keen to have his gas engine constructed along the latest lines, he is content to use steel splints and expect satisfactory roentgenograms through them.

SURGERY OR ROENTGENIZATION FOR FIBROIDS?

At the last meeting of the Mississippi Valley Medical Society, Surgical Section, November 19th to 21st, 1915, there was a discussion as to the value of roentgen treatment in uterine myoma. It was conceded that the roentgentherapy controls hemorrhage and that the tumor decreases in size. But it was argued that this control is brought about through the influence of the *x*-ray on the ovaries and the ovarian function. Attention was called to the fact that there is a large class of fibroid tumors of the uterus in young women where it is unnecessary to remove the uterus, where a myomectomy can be done and the uterus itself be preserved, and the patient can go on with the full possession of these organs through her child-bearing period.

Another surgeon called attention to the fact that with the modern surgery of fibroids, "we deal not necessarily with the whole uterus, but with the fibroid tumor. We take it out, and leave the uterus if it is healthy. We leave the ovaries almost universally, or if the ovaries are diseased, we leave one or a portion of one in order that the woman, in case the uterus is removed, may still have the internal secretions. By the *x*-ray method we are dealing with the diseased thing by destroying the only healthy thing connected with it and we are still leaving the disease behind."

Astonishment was expressed at the number of cases of menopause which certain roentgenologists report following the *x*-ray method of treatment for myoma in young women.

We should give due consideration to these views of surgeons. They should remember, also, that many of the patients subjected to roentgen treatment are in such condition that no surgery could be thought of. The view taken by roentgenologists is that the roentgen method is valuable in cases where such a plan is needed and where surgery is not desirable or where it is not possible to carry it out. J. T. C.

SOCIETY REPORTS

CHICAGO ROENTGEN SOCIETY

A meeting of the Chicago Roentgen Society was held in the Marshall Field Annex building November 19th, 1915, with Dr. James T. Case, the President, in the chair. The program included the two papers abstracted herewith.

DIVERTICULA OF THE INTESTINAL TRACT

BY JAMES T. CASE, M.D.

The subject was considered under three heads, diverticula of the duodenum, diverticula of the upper small bowel and diverticula of the colon. Diverticula of the duodenum and small bowel are of rare occurrence. Pseudo-diverticula may result from duodenal ulcer, scar, and periduodenal adhesions due to various causes, as, for instance, gall bladder disease.

The ampulla of Vater is a sort of normal diverticulum, as its name indicates, but at times the ampulla becomes very large. This enlargement, associated with spasm of the sphincter of the ampulla, probably has to do with certain cases of chronic pancreatitis.

The essayist reported fifteen cases where a very appreciable amount of opaque salt entered the ampulla of Vater. The majority of these cases exhibited signs of chronic pancreatitis or multiple diverticula of the bowel, or both. A close watch of similar cases by many observers will doubtless soon permit of definite conclusions as to the worth of this observation.

Diverticula of the duodenum are very rare. The essayist reported seven cases, five occurring in the pars inferior, two in the descending portion of the duodenum. Typical case histories were read and lantern

slides of illustrative roentgenograms were shown.

In reviewing the literature, the speaker found that eighty-two cases of duodenal diverticula had been reported from 1761 to 1911. In only a few cases of duodenal diverticula were there any clinical signs of an inflammatory process. This was true not only of the cases reported in the literature, but also in the seven cases reported by the essayist.

Multiple diverticula of the small bowel, also rare, were reported in several cases. Here again it is rare that clinical symptoms arise from the diverticula, yet the possibility of acute diverticulitis must be admitted. Typical histories and roentgenograms were exhibited of operated cases. Four cases were reported, not including Meckel's diverticulum.

Reference was made to multiple diverticula of the colon, of which the speaker reported thirty-three cases up to the first of August, 1915. In about half of the cases of multiple diverticula of the colon, no tumor was palpable, and there was no marked constipation. In other words, they were cases of enterospasm with symptoms of colitis, associated with diverticula which, by their poor drainage, doubtless exaggerate and continue the spastic condition. In the remaining half of the cases, the histories were typical of chronic diverticulitis.

Dr. A. M. Moody, pathologist to St. Luke's Hospital, exhibited the specimen and microphotographs of sections in one of the operated cases of multiple diverticula of the jejunum.

OBSTRUCTIONS IN THE STOMACH AS SEEN ROENTGENOLOGICALLY

BY DR. PAUL EISEN

We are familiar with the aspect of the normal stomach since the publication by Forssell on this subject. Therefore it is now possible for us to recognize abnormalities of the stomach when examined roentgenoscopically.

In obstruction in the stomach, we have six roentgenoscopic signs, by which we can recognize the same. These signs are:

1st—Narrowing of the lumen.

2nd—Hypertrophy of the musculature.

3rd—Distention of the stomach itself proximal to the obstruction.

4th—Residue six hours after the meal.

5th—Hypersecretion.

6th—Empty bowel.

The obstruction even when wholly or partly spastic is recognizable. At the present time with these signs in conjunction with clinical methods, an obstruction can be definitely assumed or ruled out. In our experience the clinical signs of obstruction have always been in accord with the roentgenoscopical evidence of obstruction.

Dr. Fraenkel, of the North Side Hospital, discussed Dr. Eisen's paper from the standpoint of the clinician, urging that the *x*-ray examination be insisted upon in every case. He spoke of the advantages of an intimate collaboration between roentgenologist and clinician. The roentgenologist should avail himself of every opportunity to familiarize himself with the clinical aspects of the case under his care.

M. J. HUBENY, M.D., Sec'y.

TO WHOM IT MAY CONCERN

A certain roentgen apparatus issued, some short while ago, a sticker or leaflet in which we were mentioned as using their apparatus exclusively.

This literature was so worded and was sent out in such a manner that any one would be warranted in believing that we indorsed or recommended this manufacturer's apparatus to the exclusion of all other roentgen apparatus on the market. This assumption would be entirely wrong.

In justice to the various roentgen apparatus manufacturers in this country and to ourselves, we are taking this means of notifying the medical profession that the circular can convey an entirely erroneous impression and was sent out without our knowledge or sanction.

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DEPARTMENT OF TRANSLATIONS AND ABSTRACTS

EDITOR JAMES T. CASE, M.D., BATTLE CREEK, MICH.

THEORY AND TECHNIC OF RADIOMETRY

BY TH. CHRISTEN, PH.D., M.D., BERN

(Translation from the Fortschritte auf dem Gebiete der Roentgenstrahlen, Vol. XXII, p 247.)

MY monograph on "Measurement and Dosage of Roentgen Rays" (Publ. L. Graefe and Sillem) has given rise to the complaint that my comparative tables could not be made to correspond with the determinations of other authors. I have also been favored with specimens of other scales showing that there are other comparative values in actual use.

I have convinced myself by repeated experiments that these complaints are justified and consequently communicated with the makers of the "Absolute Radiometer" (Härtemesser) in order to determine whether the half value layers and the Bakelit steps had been conscientiously manufactured in accordance with my instructions. A large number of experiments were then made showing results in absolute agreement, although differing appreciably from those formerly obtained. On the other hand, the new results agreed very well with the figures published by G. Schwartz in Strahlentherapie, Vol. I, No. 4, p. 545.

To establish the comparative values, a photographic plate was divided into three areas and rayed with a tube of a certain degree of hardness. A Bakelit step was placed on the first division corresponding to the construction of the "absolute radiometer." The second division was covered with lead during half the exposure. This division had to show the same degree of darkness as if it had been exposed to half the intensity during the entire period. Its degree of darkening, therefore, corresponded to the half value of a given radiation. Simultaneously, a picture of the Bakelit step was obtained in the first division. One of the steps had to show the same degree of darkening as the half-value division II. Its thickness was then equal to the half-value layer of the roentgen rays in question. If, for instance, that thickness amounted to 1.2 cm., the plate had been exposed to 1.2 cm. rays, etc.

A Wehnelt scale was placed on division III, so that the corresponding Wehnelt degree could be read off at any desired time.

The results have been compiled in the following table:

COMPARATIVE TABLE OF VARIOUS DOSIMETRIC SCALES

Half-Value Layer in cm.	Wehnelt	Benoist	Walter	Benoist-Walter	Bauer	Beez	Sclerometer
0.2	1.7	1.–	——	——	1.1	1	——
0.4	3.2	3.–	4.–	3.–	2.2	2	——
0.6	4.8	4.–	5.–	3.–	3.2	2	33.5
0.8	6.2	4.–	5.–	4.–	4.1	3	55.5
1.0	7.5	5.–	6.–	5.–	5.0	3	78
1.2	8.8	6.–	7.–	5.–	5.8	4	100
1.4	9.8	7.–	8.–	6.–	6.5	5	122
1.6	10.6	8.–	8.–	——	7.1	–	144.5
1.8	11.3	8.–	——	——	7.5	–	167
2.–	11.9	9.–	——	——	7.9	–	189

These results are also represented in the schematic table, fig. 1, and the graphic table, fig. 2. The latter is more easily comprehensible to those who are versed in the use of graphic illustrations. Whoever is inimically inclined toward analytico-geometric representations may consult the table

The Abstract Editor is indebted to the Zentralblatt für Röntgenstrahlen, Radium und verwandte Gebiete for material aid in the production of abstracts of many of the foreign articles.

Fig. 1.

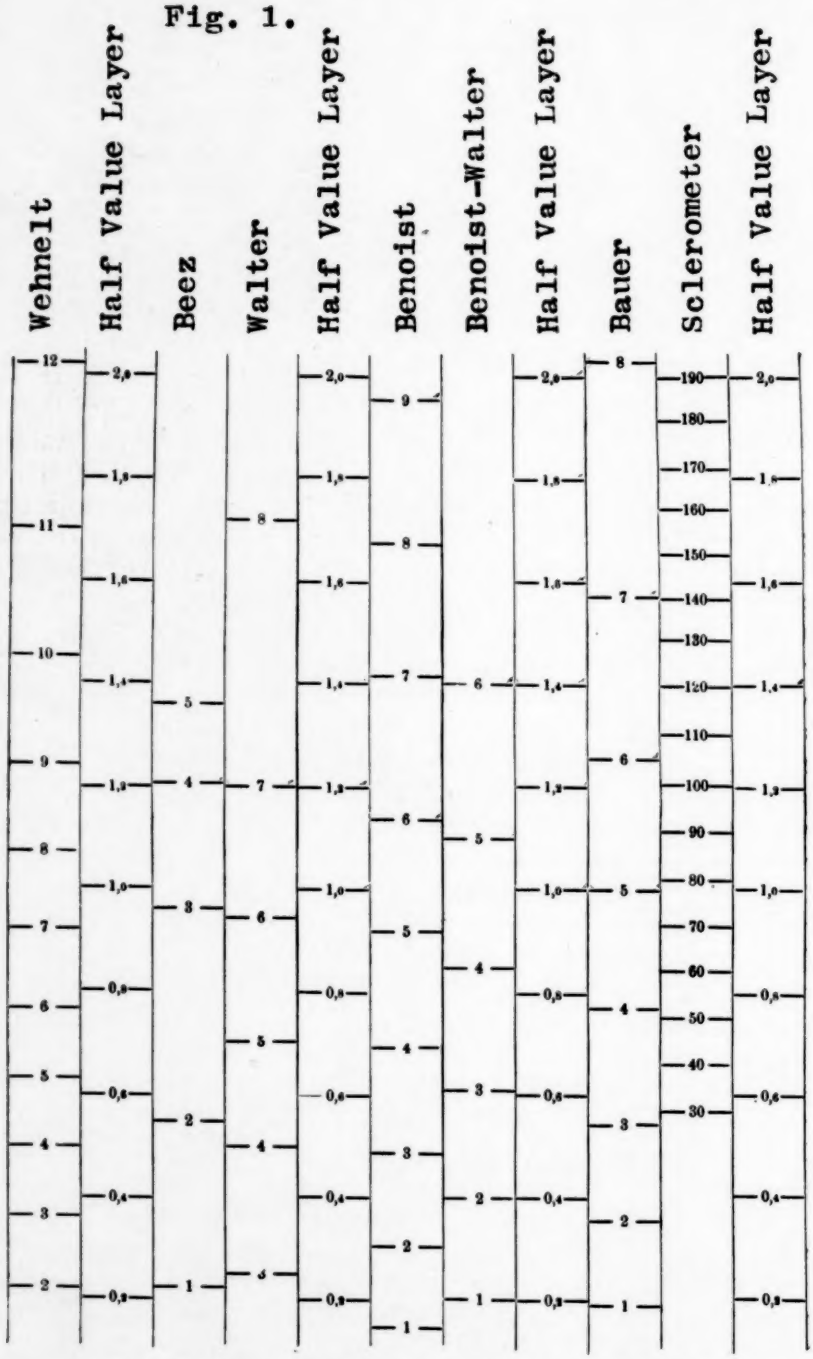

Chart for the comparison of the various dosimetric scales.

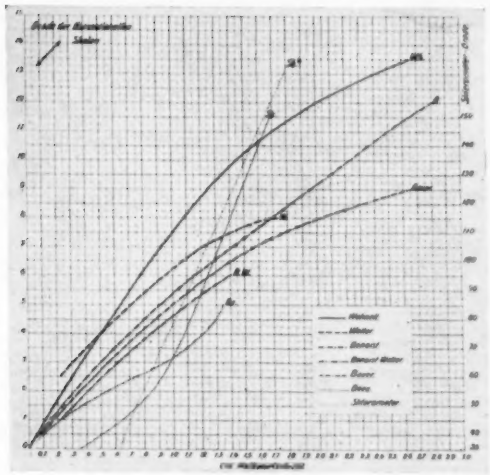

FIG. 2. The measurements upon which these graphic representations are based have been made by Reiniger, Gebbert & Schall, and the photographic plates have been submitted to me. It should be stated that for the sclerometer curve, *Sk*, an old comparative table between sclerometer and Benoist scale has been used. However, I have also inserted the curve *Sk** obtained in accordance with the latest publication of Klingelfuss. The difference between the two, however, is insignificant.

or the schematic illustration. I sincerely hope, however, that the time will not be distant when the arbitrary scales will have disappeared in the interests of science and technic, and of their devoted followers.

The method just described has been carried out leaving out of consideration the half-value layer which is an integral component part of the absolute radiometer. On the other hand, the comparative values of G. Schwartz have been determined with the "absolute radiometer," using also the half-value layer. As mentioned before, they correspond very well with the latest comparative tests.

In order to be absolutely sure, however, I have devised another instrument which has just been manufactured for me by Reiniger, Gebbert & Schall. Klingelfuss has justly blamed the "absolute radiometer" for its failure to photographically determine the degree of hardness. The new model is intended to supply this deficiency; it is illustrated in fig. 3.

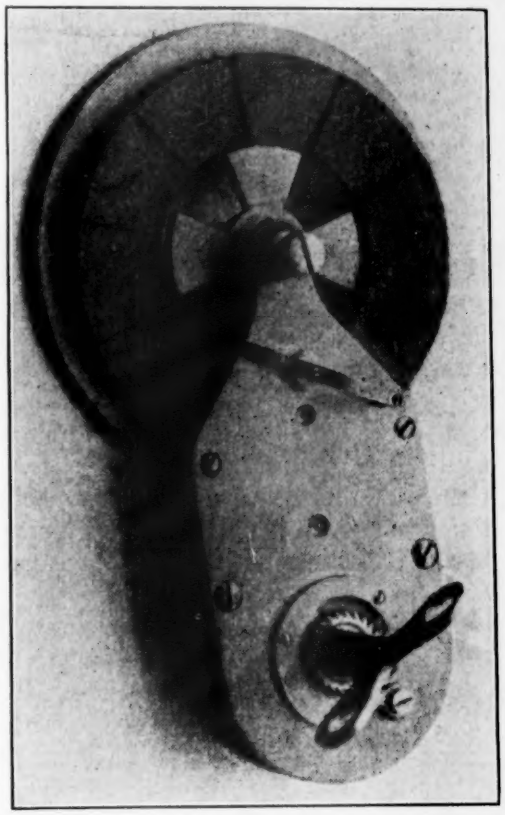

FIG. 3.

A set of Bakelit steps[1] is arranged in a circle around a movable turn-table which is provided with four teeth and four incisions of uniform size. When this disc is rotated, exactly one-half of the incident rays impinges upon the photographic plate underneath. Thus, the plate will show a central circle, the blackening of which exactly corresponds to one-half of the incident roentgen energy. Around this central circle are arranged the Bakelit steps with increasing intensity. The field showing the same degree of darkening as the central field, has been caused by the Bakelit step the height of which is equal to the half-value layer looked for.

[1] Bakelit is a synthetic resin which has the same power of absorption as water.

The rotating disc is provided with a lock-spring which is put out of action at the beginning of the tests, so that the rotation of the cog wheel may be started at the right moment. The rest of the apparatus contains a clockwork to drive the rotating disc.

The results of this measurement agree with the previous ones.

Unfortunately, the principle of the rotating cog wheel can not be used for the optical determination of the half-value layer, because the cog wheel as well as the roentgen tube represents periodical systems. Under their combined effect there can be no uniform lightness, but rather interference. As a matter of fact, a fluorescent screen behind shows magnificent figures of interference, but not the uniform half-value surface which is required in these tests.

The reliability of the "absolute radiometer" having been thus established, the question comes: What has caused the deviating results in my former publications? The unreliability of other scales is illustrated, for instance, in a recent treatise by Klingelfuss on the "Sclerometer" (Strahlentherapie, Vol. III, No. 2, p. 809):

"I may here point out the excessive arbitrariness of some scales which only serves to increase still further the unfortunate conflicting results. The Wehnelt scale has been changed, the old degree 2 corresponding to the new degree 6, the old degree 6 to the new degree 7, the old 8 to the new 10. Thus, when referring to the Wehnelt scale, it is now necessary to add 'old' or 'new.' Walter, too, seems to have made changes in his B.W. scale, although the alterations are not very considerable."

I do not care to add fuel to the flames of the controversy over the scales, but it is a fact that all arbitrary scales are fundamentally uncontrollable. Of course, it is possible to compare a scale of 1908 with one of 1914 and to find out whether the results are still alike. But when a new scale is used, it is impossible to decide whether the "scale number 6" indicates the right "hardness 6." What does 6 mean? What is the definition of "Wehnelt 6"?

Now, this number 6 has no importance in physics, it is simply an arbitrary number which may be a practical choice for technical reasons.

But when we have an instrument which is graduated after the absolute measure of the half-value layer, i.e., which indicates how many centimeters of water are necessary to absorb just one-half of a given radiation, then every purchaser is in a position to check up the readings of his instrument. If, for instance, the instrument indicates that an 8 mm.-radiation is given off from a tube, all one has to do is to cover one-half of a photographic plate with 8 mm. of water (or Bakelit or any other material of equal absorbing power) and to irradiate afterwards the covered half of the plate twice as long as the uncovered half. Both halves must then be equally dark.

The only logical conclusion to be drawn from this is: ALL RADIOMETERS IN ORDER TO BE CONSIDERED RELIABLE, MUST BE DIVISIBLE ACCORDING TO HALF VALUES.

If, for instance, there is a doubt whether the Wehnelt scale indicates correct values also for rays filtered through aluminum, the Wehnelt scale can be divided according to half values using unfiltered rays and the control can be made afterwards with filtered rays. If the results are similar in both instances then the filtration through aluminum has no influence upon the readings of the Wehnelt scale; if dissimilar, then filtration through aluminum does make a difference.

The first manufacturer who had the courage to divide his instrument by the half-value layer was Klingelfuss. Whoever has any doubt as to the applicability of the sclerometer to all inductors and tubes, can now simply test for himself whether the indications of the sclerometer divided by the half-value layers agree with the actual half-value layers.

Klingelfuss also clearly recognized a weak spot in the sclerometer, consisting in the fact that its determinations can only refer to unfiltered rays. Recently, however, he has published a table which gives the relation between the sclerometer degrees and the half-value layers for various thicknesses of aluminum.

In one respect, however, I cannot agree with Klingelfuss in that he ascribes to me a doubt as to the ability of the sclerometer scale to furnish an absolute measure of penetration. This should be understood as follows: The factor of reduction is unquestionably arbitrary, viz., the relation between the tension of the dulled wave (gedämpfte Welle) and the sclerometer figure, which Klingelfuss has irrevocably fixed at 227 volts. (The sclerometer degree 100 corresponds to a tension of the dulled wave of 22,700 volts). This arbitrary assumption of 227 volts is productive of a practically convenient figure series, but it has no physical justification. Besides, authors are not agreed on the strength of the secondary tension of a given degree of hardness. Thus, for instance, the degree of hardness B.5 corresponds to a secondary tension of 30,000 volts after Bergonié and of 14,000 after Klingelfuss.

This does not impair the practical usefulness of the sclerometer, so long as the latter indicates the given half-value layer with every apparatus, in any connection of the same, and with any anticathode (platinum, tungsten, etc.) and in varying degrees of electrode capacity.

It is simply a matter of time when the other manufacturers will decide upon adapting their instruments to half-value layers, not only because roentgenologists will, in the near future, decline to stand any longer for the present confusion,[1] but principally for the reason that the divisibility of a scale into half-values is an infallible criterion of its reliability. The greatest deviations will be found when a parallel spark gap is to be divided into half-values and then used under different working conditions.

If, in the future, a manufacturer declines to divide his scale into half-values, it does not speak well for the reliability of his instrument.

How prone we are to criticize the Englishman for declining to part with his old-fashioned, complicated system of weights and measures; and how proud we are of having adopted the cubic centimeter of water as a weight unit! And yet, in regard to measuring roentgen qualities, we are very much worse, because even the English do not have as many weights as we have scales, in spite of the fact that the half-value layer of distilled water, measured in centimeters, is just as definite a measure for the penetration of roentgen rays as a cubic centimeter of distilled water is for weight.

Until this is clearly understood we shall probably have to put up with the checkered career of arbitrary scales, as the Englishman does with his yards and ounces. As long as this pigtail is not definitely severed, conversion schemes and tables are indispensable. And thus I have worked out the above conversion table to serve as a makeshift during the transition period.

In conclusion, I would request that the degrees of hardness, as expressed in half-value layers, be not christened the "Christen scale" or designated by a "C," as has already been done. This is not a new scale with a new division, for the personal gratification of Mr. Christen: it is a question of introducing a technically well defined unity of measurement which has so far been lacking. Thus, if the intensity of a given quality of rays in a water level of 1.5 cm. is reduced to one-half, it represents a 1.5 cm. irradiation, and its degree of hardness corresponds

[1] I heartily agree with Klingelfuss: "The reading of literary matter containing figures to indicate hardness is a veritable torture, with a few laudable exceptions."

to the half-value level of 1.5 cm. and not to "number 1.5 of the Christen scale."

If I had merely introduced a "new scale" into the roentgen technic, it would hardly amount to anything meritorious, as there is no lack of them. But if I can contribute toward the establishment of order and uniformity where chaos has reigned supreme, I shall be satisfied with the result of my endeavors.

L. JACHES, M.D.

A New Therapeutic X-ray Localizer. **Robert Knox and A. St. George Caulfield. (Arch. of Radiology and Electrotherapy, Nov., 1915, No. 184.)**

The employment of *x*-rays for the localization of foreign bodies suggested the practicability of employing the central ray of the focus tube in therapeutics. The principles employed in localization are quite applicable in therapy. The method employed is that of a rotating tube, making a circle upon the surface and focusing the sheaf of rays upon a point in the interior whose depth is determined by the angle at which the tube box is fixed. The advantages claimed for this method are as follows: (1) the accuracy of application; (2) the possibility of repeating at subsequent exposures the dose primarily given; (3) the irradiations can be varied in depth and latitude in order to influence all portions of the growth; (4) if desired, the focus point can be fixed in front of or behind or at the center of the growth; (5) by changing the size of circle, one or more doses can be directed to the center of the growth. In other words, a centrally situated tumor can be approached from all directions and a maximum dose administered on a point selected beforehand.

The apparatus is the outgrowth of observations and experiments made in the Radio-Therapeutic Department of the Cancer Hospital, London. Excellent drawings and explanatory figures accompany the article.

Cardiac Anatomy and Pathology from the Roentgen Standpoint. **P. M. Hickey. (The Lancet-Clinic, Dec. 4, 1915, vol. CXIV, No. 23.)**

Hickey emphasizes the fact that lesions which affect the musculature of the heart can be graphically shown by the roentgen ray and that the different enlargements present to the experienced eye typical changes characteristic of the given lesion. Numerous cases were cited to illustrate the value of the method.

Osteoarthritis of the Hip: diagnosis in its early or pre-osteophytic stages. **Clervellyn and Jones. (Lancet, August 8, 1914, p. 365.)**

When (1) deep-seated pain, at first transitory, later constant with capsule sensitiveness, (2) pains radiating not only to the sciatic but also to the obturator and crural regions, (3) fixation of the joint as shown by slight flexion and lordosis, (4) limitation of extension, flexion, inward rotation and abduction, (5) eversion of the foot and leg, are present, one should think of the preosteophytic stage of osteoarthritis, even if the roentgenogram is negative. The physical signs are due to villous changes in the capsule. In the secondary stage, bony or cartilaginous excrescences are found. One should think of this condition in all cases of sciatica. Treatment consists in reducing obesity and correcting static deformities, like short leg and flat foot. In the acute stage the hip should be immobilized, removing the apparatus only at night. Otherwise massage, passive movements, hyperaemia, hydrotherapy and hot air baths are useful.

R. H.

Roentgen Therapy of Malignant New Formations. **H. Rieder. (Fortschritte a. d. Geb. f. Roentgenstrahlen, XXII, No. 4, p. 405.)**

1.—Large myelogenous sarcoma of the head of the humerus in a 15-year-old girl,

cured by medium soft tube previous to the era of hard filtered rays, after an operation had been given up owing to inoperability of the tumor. Patient felt perfectly well after recovery and could even play tennis. But every one of the surgeons who were shown the roentgen plates, declared that this could not have been a sarcoma or osteosarcoma, but merely an enchondroma or ostitis fibrosa. Two years later patient died from a recurrence of the sarcoma and the microscopic diagnosis was as follows: "Spindle-celled sarcoma with large marginal cells in fairly large quantities."

Renewed roentgen treatment with hard rays was unsuccessful evidently because it was instituted too late. The case proves the great importance of regular prophylactic after-treatment even after apparently fully healed malignant tumors.

2.—Carcinomatous hourglass stomach in a 42-year-old woman. Inoperable. Roentgen rays in 125 treatments at 10 minutes, or 1800 X at 18 cm., 4 mm. aluminum filter and fourfold leather. Spark gap 20 to 24 cm. 10 Amp. primary, 1.4 M. A. secondary. After operation, the gastric function was subjectively and objectively good. Body weight rose from 36 to 54 kilos. General condition satisfactory. Treatment is continued.

Roentgen and Radium Therapy of Uterine Carcinoma. **H. Füth and F. Ebeler. (Zentralbl. f. Gynäk., 1915, No. 14, p. 217.)**

The authors demand that all well operable carcinoma, where also the general condition is good, be operated upon, while all other cases should be referred to radiotherapy. The resulting recurrences after operations are unfavorable. As to technic, small doses are applied, 27 mgr. In order to eliminate unfavorable by-effects, the radium is allowed to work insidiously, i. e., with 2 to 5 hours' initial raying, gradually rising to 10 to 12 and even 24 hours, where these doses are well borne. In this way the authors believe to achieve a considerable diminution or a total elimination (in 53% of the cases) of the untoward by-effects.

Radiotherapy of Cancer. **A. Döderlein. (Zentralbl. f. Gynäk., 1915, No. 12, p. 185.)**

Döderlein is an undisputed advocate of using radiotherapy in carcinoma also in operable cases, but emphasizes the fact that the technic is sadly in need of working out. The minimum dose for uterine carcinoma is 50 mgr., he says. In very large carcinomas of the cervix 200-300 mgr. are used in one dose. Time of exposure 24 hours, repetition after 2 weeks, later every 3 to 4 weeks. The best filter is nickel-plated copper covered with Para rubber. The most serviceable means to prevent injury of the healthy tissue is an arrangement to hold the ray-carrier in the center of a colpeurynter, as this would guarantee a regular distance. Duration of treatment can only be decided upon from time to time. The hypertrophic forms of carcinoma (cauliflower growth) are much easier to influence than the indurating forms of the cervix.

Döderlein has had the same favorable experience in uterine as well as mammary and rectal carcinoma. He has not succeeded in preventing the troublesome irritation of the healthy rectal mucosa, but he has mastered so far every cicatricial stricture by methodical high infusions. In mammary carcinoma Döderlein digs a tunnel under the tumor in which the raying body is embedded by means of a drainage tube.

Roentgensterilization. **L. Görl. p. 216, No. 69. (Berliner klin. Wchnschr., 1914, No. 47, p. 1839.)**

This article deals with the indications and contraindications of roentgen treatment in gynecological affections. The reasons for

and against small or large areas are technically considered. Author uses three ports of entry: middle over symphysis, right and left ovarian region, two dorsal applications with hard tube and without filter. The results are very good.

Hypersensitiveness of the Hair Papillae for Roentgen Rays in Psoriasis. **Robert Kienböck. (Fortschritte a. d. Geb. d. Roentgenstrahlen, XXII, No. 6, p. 591.)**

Hypersensitiveness of the hair papillæ, in which the weakest roentgen doses caused epilation, has often been described. Kienboeck's patient was a young woman of 21 whose head had been rayed in 6 places with 2¼ X each for psoriasis. Nineteen days later the hair began to fall out. A month later epilation had made considerable progress and in another three weeks there was almost complete baldness. In another three months the hair began to grow again. It is necessary to be prepared for these contingencies and to apply but weak doses in such cases. It would appear that soft light without filter causes less injury to the hair than hard filtered light. This is evidently an exaggerated case of hypersensitiveness, and not an idiosyncrasy.

One Hundred Suffering Women Treated with Roentgen Rays. **Richard Sielmann. (Fortschritte a. d. Geb. d. Roentgenstrahlen, XXII, No. 3, p. 277.)**

Report on the treatment of 32 cases of myoma.

Report on the treatment of 10 cases of metropathy.

Report on the treatment of 8 cases of climacteric hemorrhage.

Report on the treatment of 9 cases of dysmenorrhea.

Report on the treatment of 16 cases of malignant affections of the genitals.

Report on the treatment of 25 cases of mammillary affections.

Technic.—Focus-skin distance 28-30 cm., later 20 cm.; spark gap 14-22 cm.; 8-10 Amp. primary; 0.5-2 M. A. secondary; filter, first leather, now 3 mm. aluminum; hard tubes, Polyphos inductor with Simon interrupter.

Of 32 myomas, 20 were completely cured. All the metropathic cases were cured. Of 8 hemorrhage cases, 7 were cured. In 9 cases of dysmenorrhea there were 5 cures, 3 improvements and 1 negative. Of 16 carcinomas 3 were inoperable, 2 were very favorably influenced, 1 died of apoplexy, 6 were materially improved, 4 cases which were prophylactically rayed after carcinoma operation remained cured. One case of carcinoma of the urethra was materially improved; 2 cases could not be followed up. In the affections of the mammary gland there was one case of abnormal secretion which was favorably influenced. All the rest were carcinomatous. Roentgen treatment partly before operation, partly after operation was declined. With the exception of 6 cases which are still under treatment or where treatment was interrupted, results were favorable everywhere.

Permanent Therapy. **Alexander Pagenstecher. (Strahlentherapie V., No. 1, p. 402.)**

The author has endeavored in previous contributions to introduce the permanent treatment with hard filtered roentgen rays, instead of the customary serial treatment with light filters. The problem was to send large quantities of hard rays into the deep parts without any injury to the skin. A Gundlach-TK-tube at 2-3 M. A. and 1 mm. lead, supplies in 1 hour only ½ X, with ¼ mm. only 3-4 X. After using 1 mm. lead, the author returned to ¼ mm. The number of communicated cases is only small (4), but inasmuch as they are inoperable cases,

the favorable results show that the permanent treatment has been beneficial (sarcoma of the tonsil, sarcoma of the hard palate, carcinoma of the ear and carcinomatous glandular tumors of the neck).

But it is hardly an economical procedure to apply rays for weeks at the rate of ½ X per hour, and further communications are promised as to the possibility of economy. The method should be tested by others.

Therapy with Heavy Filters. S. Loewenthal. (Strahlentherapie, V., No. 1, p. 195.)

Loewenthal endeavors once more to prove that *x*-rays which have passed through 1-2 mm. of lead are sufficiently hard to be regarded as approximately homogeneous for all depths of the body and to produce the same effect as gamma rays of radium and mesothorium. A roentgen tube should pass through 1 mm. of lead a sufficient quantity of hard rays to be equivalent to 1600 mgr. radium bromide at the same distance from the skin, and by this excess of intensity it is hoped to counterbalance the drawback that with roentgen rays we cannot attack the pathological focus at close quarters as can be done with radium. The question, however, still is to what tissue substances the hard rays have to direct their attack, and not until this is answered can the selection of heavy filter substances be decided upon.

On the Principles of Radiotherapy of Benign and Malignant Tumors. C. J. Gauss, Freiburg. (Strahlentherapie, V., No. 1, p. 379.)

The chief principles of radio-treatment, especially that by roentgen rays, of benign tumors, is the application of large doses of penetrating rays, such as are obtained by the use of hard metal filters, and of cross fire. For the treatment of malignant tumors by means of mesothorium, Gauss demands that the "critical doses" should be established for each individual case, i. e., the product of intensity and time of raying which is necessary to produce favorable changes in carcinoma. The "minimum dose for carcinoma," i. e., the dose which causes carcinoma to disappear, amounts to one-half the erythema dose according to his observations, if absorption and dispersion are of no consideration. If the latter is the case, as in deep-seated carcinoma, the deep effect must be improved by such means as cross-fire, or refractory dose rays with intervals, and at a certain distance from the skin for the purpose of attaining a better homogeneity of the rays. Treatment on this principle requires larger radium quantities.

Gauss does not admit that roentgen treatment is of equal value in malignant tumor.

Radium and Roentgen Treatment of Malignant Tumors. A. von Eiselberg. (Arch. f. klin. Chir., 106, No. 1.)

1.—*Radium in Malignant Tumors.*—Prophylactic Treatment: 4 cases of lingual carcinoma, rayed without success. Curative radium treatment: external raying of the tumor and intra-oral. There were 250 mgr. of radium ready for use. Eleven cases were "cured" for the time being, i. e., the tumors had disappeared. Transitory results were achieved in 16 cases. In 7 cases the result was negative. In 17 cases there was an injurious effect of the radium: in 5 cases ichorization and decomposition; in 6 cases increased cachexia; in 5 cases increased hemorrhage and in 1 case rapid growth of the tumor (sarcoma of the forearm of a 10-year-old girl).

The effect of the radium is very intense, but not elective for carcinoma, as it also destroys other tissues, vessels for instance. Radium destroys the brain substance and

causes meningitis. It has no influence whatever on metastases, and it is for this reason that the basal sarcoma cells which are quite locally situated, are so favorably influenced.

2.—*Roentgen rays in malignant tumors.*—Nineteen cases. More or less favorable results. There can be no question as yet of a permanent success, but the results are noteworthy and demand further endeavors. All cases were either inoperable or they were recurrences after operations. The unpleasant complications of roentgen rays must be put up with, such as gastric complaints, difficulty in breathing when very high doses are administered (tracheotomy!). Skin injuries cannot always be avoided. For prophylactic treatment, roentgen rays are preferable to radium, because larger surfaces can be uniformly rayed. Deep-seated tumors are left for the roentgen treatment in any case. The best results in suitable cases are produced by a combination of radium and roentgen rays. Too weak applications of rays involve the danger of increased growth on account of irritation. Operable carcinoma must still be removed by operation, and it is a mistake to allow patient to choose between operation and radiotherapy.

Cystoscopic Findings in the Roentgen Treatment of Collum Carcinoma and Their Practical Application. (Strahlentherapie, V., No. 1, p. 92.)

If the bullous edema of the bladder mucosa and the edema of the bladder wall (characterized by the formation of transverse folds) persists with the spreading of the carcinoma to the bladder, the course is unfavorable. On the other hand, the mere disappearance of the edema is not sufficient to draw a favorable conclusion. Cystoscopic control is important for the timely recognition of gangrene threatening from radio treatment which should be interrupted to prevent fistula formation.

Roentgen-Therapy of Tuberculous Peritonitis. F. Albertario. (Gaz. med. Ital., 1914, No. 17.)

The author has inoculated guinea-pigs with tubercle bacilli, treated them with *x*-rays and killed them after various periods. It was seen from the autopsy that the tuberculous process, especially of the lymph glands, was more inclined to involution and less inclined to extension, the longer roentgen treatment had been continued.

The author believes it possible to achieve true destruction of tuberculous foci and true anatomical repair, if the treatment is continued for a sufficient length of time. In these experiments none but hard rays without filter were used.

The author has also treated a number of patients with tuberculous peritonitis by way of experiment and arrives at the following results:—

(1) Roentgen rays unquestionably exert a favorable therapeutic influence on chronic tuberculous peritonitis.

(2) The therapeutic effect is particularly pronounced in the fibro-plastic forms. This is also observed in the forms associated with ascites, provided a paracentesis is done before instituting roentgen treatment.

(3) The local effect is expressed by the relief or arrest of pain, abdominal tension and meteorism, and there is a fibrous transformation of the peritoneal lesions and a resorption of the exudates.

(4) There is also a general effect in nearly all cases which is shown by an improvement of the general condition.

(5) The favorable therapeutic effect of the roentgen rays is not transitory, but permanent, and there is not only a cure in the clinical sense, but an anatomical healing of the tuberculous foci.

(6) In those cases where healing of the foci could not be effected, the roentgen rays proved a valuable adjuvant. They should be employed in all cases.

Roentgen Rays and Pregnancy. **H. Edelberg, Munich. (Berl. klin. Wchnschr., 1914, 27.)**

It has often been said that gynecological *x*-ray treatment might cause injury to the gestation cells which, without being serious enough to effect complete sterilization, are sufficient to cause inferior development of the fetus. Animal experiments by Fraenkel seem to corroborate these apprehensions.

Edelberg, however, observed the condition of a child which had been conceived while the mother was under the full effect of *x*-ray treatment. Patient had received 146 X within 3 months, using a 10 cm. compression tube, 6 abdominal and sacral points of entrance, a hard tube of 10 Wehnelt, a 3 mm. aluminium filter and 18 cm. focus-skin distance. During this treatment conception took place, 35 X of the total quantity of 146 falling into the period of gestation. The child was born at the normal time, was normally developed, had all the signs of maturity, was well nourished, and there was nothing pathological about him.

Although this is quite an isolated observation, it seems to show that the danger of injury in this direction is not very great.

The Interpretation of Certain X-ray Appearances in Intestinal Stasis. **Prof. Arthur Keith. (Lancet. Royal Society of Medicine, Electro-Therapeutic Section, Oct. 15, 1915.)**

Professor Keith said that roentgenologists are at present divided into two groups: those who regarded intestinal stasis as a result of mechanical obstruction, and those who regarded the condition as resulting from a functional disturbance of the bowel. In Great Britain those differences were due to the researches carried out by Sir William Arbuthnot Lane and Professor E. H. Starling at Guy's Hospital in the closing decade of last century, the first-named by means of the knowledge derived from the dissecting-room and hospital wards, and the latter through the physiological laboratory. Sir Arbuthnot Lane regarded the abdominal viscera as suspended by their mesenteries; when any segment of the bowel became overloaded it dropped, its mesentery throwing out strengthening bands of fibrous tissue in order to meet the increased strain. Either by the constricting action of these bands, or by kinks resulting from the sagging of the viscera, a series of obstructions were initiated at various points, chiefly at the lower end of the pelvic colon, the hepatic flexure, the ileocecal junction, the duodeno-jejunal flexure, and at the pylorus. Sir Arbuthnot Lane's theory offered a rational explanation of the sequence of events, the obstructions higher up following those at the lower end of the bowel. Professor Starling, with the help of Dr. W. M. Bayliss, set out to elucidate the conditions regulating the passage of food along the intestine. It was found that its musculature, like heart muscle, had a definite rhythm, and that the propulsion of food depended on a complex series of reflexes which took origin in the wall of the intestine, but subject to external influences manifested through the vagal and splanchnic nerve-paths. This excitability and rhythm were more marked at the higher than at the lower parts of the bowel, and disturbance of one part upset the nerve mechanism of another. Dr. T. R. Elliott early in the present century made the important discovery that the circular musculature at the end of the ileum was sphincteric in action. At about the time of Sir Arbuthnot Lane's and Professor Starling's researches Professor Keith's attention was drawn to similar problems in the dissecting-room of the London Hospital, and was struck by the number of patients who had the abdominal viscera displaced towards the pelvis. After he had been working at this for some time he found that Glénard had investigated the condition as a clinical entity and named it "enteroptosis." Professor Keith's observations led

him to believe that the muscles in the abdominal wall are the main agents in maintaining the viscera in position when the person is standing up; and that these muscles are called into action by reflexes which arise in the abdominal viscera when the erect posture is assumed, and that while the mesenteries act as ligaments they only act when muscular support has been overcome; ligaments he regarded as only secondary agents when the primary ones had given out. Sagging of viscera must be due to a defect in muscular supports. Intestinal stasis and ptosis of viscera were closely related conditions, one usually accompanying the other. Professor Keith's recent examination of a series of colons which had been excised to relieve intestinal stasis showed that stasis and ptosis might be manifestations of the same lesion and the explanation he submitted was based on Professor C. S. Sherrington's discovery that stimulation of the splanchnic nerves threw the abdominal musculature into tonic contraction. In most of the excised bowels which he examined both the peritoneal covering and the intramuscular nerve plexus were visibly altered. Possibly the elongation of the stomach or of the transverse colon might be susceptible of a similar physiological explanation. Professor Keith then proceeded to describe the work of Dr. Alvarez on similar lines, and elaborated his thesis in considerable detail by the aid of a number of drawings and roentgenograms, some of which illustrated the three peritoneal bands discovered by Dr. Colin Mackenzie.

Dr. A. F. Hertz, in his discussion of Professor Keith's article, expressed his almost entire agreement with all that had been advanced. He considered, however, that the relationship between intestinal ptosis and stasis was not as intimate as the opener supposed; sometimes extreme ptosis was seen without stasis. In a case of congenital absence of abdominal muscles in a child, which permitted of the viscera being moved to any desired position, there continued to be quite regular action of the bowels. Conversely, he had seen very severe intestinal stasis without ptosis. Also, perhaps the anatomical changes in cases in which the colon had been removed were too much emphasized, because they were end cases. In the majority of cases seen no one would dream of doing colectomy. With regard to a sphincter action in the transverse colon, he had seen a mass movement of the colon take place in a large number of cases. A large peristaltic wave seemed to commence a little beyond the hepatic flexure. He had never seen an antiperistaltic wave under natural conditions. He contended that the only cases susceptible of the mechanical explanation were gross cases due to obstructions caused by such conditions as tumor or tuberculous disease.

A Needle Lodged in the Duodenum. **W. A. Lincoln. (Canadian Medical Journal, September, 1914.)**

Lincoln reported an interesting and unusual case, in which a needle remained lodged in the duodenum for a year. Following a severe head injury, the patient remained in bed for several weeks, partly in delirium. She had a mania for biting and putting things into her mouth, but was not known to swallow anything. After her recovery, she complained of sharp pain in the region of the umbilicus, or a little above it, which came on a little while after taking food, the nature of the food making no difference. The pain always ceased at the end of digestion. Occasional nausea. No vomiting. No evidence of blood in the stool. *X*-ray examination in connection with the bismuth meal revealed a needle in a perpendicular position, one inch to the right of, and the same distance above, the umbilicus. Stereoscopically, the needle was seen to lie in front of the spine, fairly deep in the abdomen. Although observed for some time, the needle

did not alter its position, except for slight lateral movements. At operation a blackened and eroded needle was removed from the duodenum behind the transverse colon. Patient made a good recovery.

Roentgen Studies After Gastric and Intestinal Operations. **James T. Case. (J. Am. M. Ass., 1915, LXV, 1628.)**

The post-operative roentgen study of gastric and intestinal cases is of decided importance to the surgeon. The author has clearly shown its value in the diagnosis of acute small bowel obstruction; has watched the movement or stagnation of food after gastroenterostomy; has observed a fairly constant cecal stasis occurring after appendectomies; and has again called attention to a method that bids fair to obviate some of the marked unsatisfactory results of many colonic operations.

No preparation of the patient is needed for the roentgen examination of the post-operative acute small bowel obstruction. No barium is needed, the gas distention affording sufficient outline of the intestine for the roentgen study. The existence of an obstruction, the degree of the hindrance, and its location can be determined from the roentgenogram. The serrated contour of the small bowel differentiates it from the large bowel with its haustral markings. If the gas collections are seen to occupy the middle of the abdominal shadow while the flanks are gas-free, it is probable that the obstruction is in the lower ileum, though not so low as the ileocecal region. When the gas areas occupy the true pelvis and the middle of the abdominal shadow, one may suspect the ileocecal region. If the cecum contains gas, it is not likely that the obstruction is in the small bowel. The barium enema may be used to rule out colonic obstruction. Intussusception can thus be readily detected.

The author's large experience in the study of the causes of intestinal stasis in pre-operative cases gives his opinion much weight in the interpretation of why the stasis still persists after colectomies, ileo-colostomies, and ceco-sigmoidostomies have been performed. Antiperistalsis continues even if a half or more of the colon has been removed and an obstinate residue forms in the stump of the colon which persists for many days, in spite of repeated daily enemas and the use of laxatives.

Repeated and numerous observations after ileo-colic valve repair prove that Kellogg's method is a rational procedure in cases of ileal stasis. The valve once incompetent is always incompetent, and its repair combined with corrected diet and hygienic measures overcome ileal stasis. J. D. O.

Prostatic Hypertrophy, Chronic Prostatitis and Periprostatitis. **G. Rosti. (L'Ospidale Maggiore, 1914, No. 3.)**

The author has treated 5 cases of prostatic hypertrophy and 3 cases of chronic prostatitis and periprostatitis by radiotherapy via the perineum. In all cases there was improvement and disappearance of the subjective symptoms (pains, tenesmus, etc.), although he administered only medium doses. In chronic prostatitis and periprostatitis, which were all due to gonorrheal infection, there was always rapid reduction of the prostate and resorption of the periglandular infiltration. In 4 cases of prostatic hypertrophy (fibromyomatous form of the 2nd and 3d degree with retention of urine and ischuria paradoxa), treatment could not be continued, although the subjective manifestations had already undergone some improvement. In the 5th case the only result was an improvement of the subjective manifestations.

The author concludes from his observations that radiotherapy renders very good service in prostatic hypertrophy of the first degree and in chronic prostatitis and peri-

prostatitis, but that it has little effect once the prostate has undergone a fibrous degeneration.

Contributions and Transactions of the Special Commission for Dosimetric Comparisons of the German Roentgen Society. **(Fort., a. d. Geb. d. Rontgenstrahlen, xxiii, No. 1, p. 69.)**

On April 18, 1914, the German Roentgen Society, on the motion of Levy-Dorn, appointed a "Special Commission for Dosimetric Comparisons," consisting of 15 members of the Society. President is Dr. Holzknecht. In his first report he communicates the circular letter he has addressed to all members of the commission. In this circular, the necessity of the work assigned to the commission is pointed out, followed by the suggestion to determine as the first point of the program the way to be taken for performing the work. He believes the best plan is for all members of the commission to record their ideas in writing, because verbal intercourse would be of little use in view of the difficulty of the matter and the length of the arguments to be expected. The first question submitted to members was:

"In which tentative way is in your opinion a comparison of the dosimeters to be attempted?"

The 8 answers which have been received are now reproduced in full.

1. *Levy-Dorn, Berlin:*—Each dosimeter to be examined (tested) by 3 members, one of whom should preferably be the inventor. The following instruments to be used for comparison: Radiometer of Sabouraud-Noire with and without Holzknecht's dosimeter, and Kienboeck's quantimeter. The comparison to be made with the various degrees of hardness of the Benoist scale (photographically), without and with filter. The tests to be made with various instrumentaria.

2. *Kienboeck, Vienna,* proposes to make the tests on the skin of the back of healthy adult individuals: (1) with soft light, (2) with medium-soft light, (3) with medium-soft light and 1 mm. aluminium, (4) with medium-soft light and 3 mm. aluminium, determination of the degree of hardness with the Benoist scale. Dosage after Sabouraud-Noire-Holzknecht. Analysis of the degree of hardness with quantimeter strips. Precise information as to instrumentarium, etc.

3. *Klingelfuss, Basle,* refers to his numerous previous publications (sclerometer).

4. *Wertheim-Salomonson, Amsterdam,* believes that the physical part of the dosimeter question should be separated from the physiological part. Only the physical part can be answered with accuracy. This above all includes a careful examination of the quantitative composition of the mixture of rays. It is only with this question settled that the usual dosimetric methods can be compared with the former.

5. *Meyer, Kiel,* communicates the result of a number of experiments he has already made. He thinks the instruments of Sabouraud and Kienboeck do not indicate such great discrepancies at all as has lately been assumed and they can be very well compared with each other. According to his findings, both dosimeters always run parallel in changing degrees of hardness and in changing mixtures of rays.

6. *Von Wieser, Vienna,* demonstrates in a long dissertation that first a homogeneous quality of rays must be established and measured, before comparisons can be made. The faults of the present technic were rather those of the qualimeter than of the quantimeter. It is necessary therefore to introduce a new and more purposeful qualimetry. Comparative tables with homogeneous rays should be established for the dosimeters.

7. *Fürstenau, Berlin,* believes the solution of the question to lie in the application of instruments which measure the intensity of rays. His opinion is that the task of

roentgen dosimetry is not to determine the physical dose, but simply the intensity of rays and, by multiplication with the time, also the superficial energy. The measuring methods must be so developed that, on the one hand, the quality of the rays—i.e., hardness—can be established, and, on the other hand, the quantity of rays, in technically unobjectionable figures. The question of dose in the sense of absorbed rays is only of secondary consideration.

8. Christen, Berne, holds that quite a series of points has to be taken into consideration: (1) quality of rays, homogeneous rays or mixed rays; (2) measuring of hardness; (3) areal homogeneity; (4) dosage in absolute units. He demands the establishment of an international central bureau on the model of the International Bureau for Weights and Measures at Sèvre. Such a bureau would have to be appointed by a commission of physicians, physicists and technicians of all civilized nations and would have to consult on the establishment of an "International Office for Radiometry."

As will be seen from the contributions of the members of the commission thus far received, the solution of the dosimetric question is even far more difficult than was imagined at the time the commission was appointed, although even then the difficulties of the matter were supposed to be pretty well understood. The opinions of the various members vary considerably, and no positive result has so far been the outcome. In the opinion of the reviewer, such a definite and generally recognized result will not be attained in the immediate future owing to the nature and complexity of the subject. There are questions of a scientific trend which had better be left to the solitary investigator, being too difficult and complicated for common discussion. From the multiplicity of scientific details a final and common structure will then gradually evolve in the natural course of things. This, however, requires much, often very much time.

In his concluding remarks Holzknecht—moved, possibly, by similar reflections—confines himself to requesting members simply to continue their work in accordance with present possibilities, adding in a general way: "The subject of further contributions, therefore, would be anything that may appear suitable to improve the present unsatisfactory state of dosage."

Healing of Serious Fractures by Means of Irritative Roentgen Doses. **Manfred Fraenkel. (München. Med. Wchnschr., 1915, No. 8, p. 211.)**

Fraenkel has already published a former report (Zbl. f. Chir., 1914, No. 26) on his method of influencing serious fractures by large doses of roentgen rays. The war with its great number of complicated, serious fractures was an incitement to follow up this method. Up to the present, 40 cases were treated with the irritation dose, many of them with favorable results. Three are described in detail. A total smashing of the radius is particularly instructive, the union being more rapidly effected under *x*-ray therapy, than is usually observed. Large skin defects, fistulæ, etc., may likewise undergo prompt healing under the *x*-ray. In conclusion, the author deals with roentgen therapy in surgical tuberculosis, refers to several publications on the subject, notably those of Splin and Wilms, and dwells upon their encouraging results.

Acromegaly Treated with Roentgen Rays. **A. Gunsett. (Strahlenther. v, No. 1, p. 70.)**

The cause of acromegaly is a tumor of the hypophysis. Formerly a "noli me tangere," it has been surgically treated since 1906 (hypophysectomy). In more recent times (since 1909) roentgentherapy has also been tried. Gunsett improved upon the technic by using eleven raying areas, thereby securing a more rapid and efficacious re-

sult. The field of vision has become normal in the course of two months, the visual acuity is almost normal. He administered 410 X with 4 mm. filter from Feb. 3 to April 9.

After results such as this, we believe that none but the roentgenological procedure is indicated, because the surgical treatment has to reckon with a high percentage of mortality (10 deaths in 37 cases).

Mixed Bone Tumor (Osteomyxoma). **Antonio Marco del Pont. (Zent. f. chir. u. mech. Orthopädie, Sept., 1915, p. 195.)**

Of the mixed bone tumors osteochondroma is most frequent. Next in order of frequency is osteofibroma, and of the malignant tumors osteosarcoma of different origin and composition. To these he adds a hitherto undescribed mixed bony tumor, —osteomyxoma. It is formed in a peculiar manner by the union of hard and soft organic tissue. The tumor in the author's case was the size of a nut and was found in the right maxillary sinus during an infection of that sinus. R. H.

Late Periosteal Changes in Dysentery (Ueber periostale Späterkrankungen nach Ruhr). **J. Rauch. (Zent. f. chir. u. mech. Orthopädie, Sept., 1915, p. 196.)**

The authoress observed four cases of periosteal stratification of the tibia, and one of the fibula, similar to the changes accompanying typhoid fever. Typhoid fever could be excluded in this case, and dysentery was later discovered. Roentgen ray as treatment proved effective. R. H.

Concerning Roentgenstereoscopy. **W. Salow. (Berl. klin. Wchnschr., 1915, Sept. 13, Vol. LII, No. 37, p. 979.)**

Everybody knows the plastographic pictures which were to be had at all photo dealers a few years ago. Two stereoscopically different pictures of the same landscape were printed on top of each other, one in green and the other in red. The colors were spectroscopically selected so that the red would not allow green to pass through, and vice versa. Looking at the picture through cardboard spectacles with red and green gelatine windows, the two colors were "unscrambled," causing a stereoscopically different dark picture to appear on each retina. The combination of the two produced a wonderfully plastic picture.

I would call attention to the fact that plates made after Fürstenau's or any other method in which the focal distances of the two exposures are 65 mm. can be used to produce the stereoscopic effect. One picture is colored red and the other green and the two are viewed through red-green glasses. The "Marke" (indicators) will then appear quite in front, the bones further back, and the projectile still further away at the correct distance, provided the prepared plate is 60 cm. distant from the eye.

I have now constructed a "foot-measure" in red-green which has been marked in divisions by means of my measuring plate and, when attached to the picture, always appears plastically with it. This instrument is shifted along the parts of the picture to be measured, and the distances may be read off in centimeters. The millimeters can be easily estimated.

If the marks are not to appear on the roentgen plate, a copy of the latter is made on transparent paper, and the entire figures or their contours are painted red and green. When the latter method is used, the beginner will have some difficulty to accommodate his eyes to obtain the plastic effect, but when the necessary experience has been acquired by practice, the reward will be absolutely perfect plastic results. Colors and measuring rule are sold by the Polyphos Co., or their Berlin representative: Paul Wertheimer, Charité-Str. 4.

Filtered Roentgen Treatment in Chronic and Subacute Eczema. Fritz M. Meyer. (Deutsche med. Wchnschr., 1915, April 22, Vol. XLI, No. 17, p. 492.)

Ever since Hahn, in 1901, recommended roentgen treatment in eczema, numerous reports have appeared confirming the value of the treatment. However, when there is extensive material to gather experience from, especially material consisting of patients who can not interrupt their occupation while under treatment, the expected improvement is often seen to set in after a very long time, without even leading to a permanent cure. I include these cases in the generic term of "refractory to roentgen treatment."

These results can be improved by the application of hard rays, as was first suggested by Frank Schultz in 1912 in a practical way. Since then I have repeatedly reported on the effect of both unfiltered and filtered hard rays upon eczema.[1] Similarly good results were also reported by others.[2] The present communication is a further contribution, as I have had an opportunity of considerably increasing my material in the course of the last few months.

The technic is of great importance. I use tubes of 10-11 Wehnelt with a 1 mm. alum. filter which I do not apply direct to the skin but to the cassette containing the tube. The focal skin distance is always 20 cm. The current should not be too strong, because in the raying of eczema a comparatively small quantity of rays is applied, and a high current with a corresponding shortening of time would render the dose unreliable. On the other hand, the otherwise excellent small tubes, which are ordinarily used for skin treatment, are absolutely useless, because it is difficult to get the desired hardness with them, and it requires a considerable time to obtain a full dose. I apply at each treatment ½ dose (measured under the filter after S-N); after a week, the second ½ dose follows, and the same treatment is continued, ½ dose with a week's intermission—until 2½ full doses have been administered. After an interval of 3 weeks the same series may be repeated, if necessary. Aside from transitory pigmentation in a few isolated cases, reactions have never been seen. This is not surprising, because the S-N dosimeter is arranged for medium rays, and if harder rays are desired the dose is reduced, i.e., the skin in this case is less susceptible than the pastille, so that the full dose measured on the basis of the pastille may be exceeded. Without taking into consideration the varying susceptibility of the different areas of the body, two full doses may be fearlessly administered at 10 Wehnelt, using the fractional rays customary in skin diseases. When using a filter, the under-dosage is, of course, still greater. With this technic, therefore, the danger of a skin reaction is at the most equal to, but probably far less than, that of a full dose of medium rays. In other words, the quantity of rays absorbed in the skin through a 1 mm. alum. filter at 10 Wehnelt is probably less than the quantity absorbed by the skin in the application of medium rays, if in the first case 2½ full doses and in the second case 1 full dose have been administered.

My experience has been gained on 38 patients[3]: 7 with acute eczema and a total of 14 foci, and 31 with chronic eczema and a total of 59 foci. Two cases of the latter series will be dealt with separately. There having been no difference in technic and time between the acute and the chronic form, they will be discussed together. In most cases the eczema had involved the hands and in one case the nails also. There was also

[1] *Strahlentherapie*, Vol. 2, No. 2; *Dermat. Zschr.*, Vol. 21, No. 3. Tenth Roentgen (Jubilee) Congress, April, 1914.

[2] Ritter, *Strahlentherapie*, Vol. 3, No. 2. Pagenstecher, Tenth Roentgen (Jubilee) Congress, April, 1914. Pförringer, *Fortschritte*, Vol. 21, No. 5. C. Stern, *M. m. W.*, 1914, No. 9.

[3] Part of the cases were referred to me for treatment from Dr. Ludwig Fischel's polyclinic material.

eczema of the arms, lower extremities, abdomen, forehead and nose. Sixteen patients had not been treated before, 11 patients had been treated with salves though quite unsuccessfully, 7 with slight and 2 with good results. In 19 cases there was eczema of the hands—in 8 of them due to occupation. In 1 case the occupational eczema had attacked the lower arms. Of these 20 patients, only 7 were able to interrupt their occupation, while the other 13 were in constant contact with water and soap, the causative factors of their complaint. In 3 cases the affection had been present for 10 years, while in the other cases it varied between 7 weeks and 5 years. Thus, the material was unfavorable, many cases being of long standing where other treatment had failed, and only few patients being able to keep away from their occupation. This should be emphasized, because the nature of the material is, of course, of considerable importance in the valuation of the treatment.

I employed no salves whatever. There was a complete cure in all of the 36 cases, i.e., none of the cases was refractory. No more than one round of treatments was needed in any of the cases, while in some the whole series was not required. In patients who belong to the working class, many months are often necessary to effect a cure and sometimes only an improvement; and a positive success can not be held out unless the noxious occupation is discontinued during treatment. If, for instance, raying is instituted according to the method explained in Frank Schultz's textbook, it is in my experience not at all a normal result to effect a cure in one series, always provided that the same class of material is used. The greater the restriction a patient is to undergo, and the longer the healing process is delayed, the more difficult it becomes to score a success.

It is just in this point that the value of the filtered rays lies, viz.: (1) that they place us in a position to effect a cure in a short time of 4 weeks or less; (2) to obtain this result regularly, and (3) to eliminate the condition of discontinuing the occupation.

Isolated cases may perhaps require a repetition of the treatment, but from the experience gained they may be classed as very rare exceptions. An isolated case may also turn out refractory, but I have seen none in my 36 cases. And yet, Frank Schultz states that it is just in occupational eczema that often only repeated serial treatments could lead to satisfactory results owing to the stubborn resistance offered to this therapy. This drawback is overcome, which is the more important in view of the fact that in the application of long-continued part doses the skin may undergo grave changes.

These considerations and comparative statistics conclusively prove the superiority of the new method. Even in favorable cases, in which the desired effect could probably be secured with one series of unfiltered treatments, preference should be given to the filtered rays owing to the still further decreased danger of a skin reaction. Guarding against these injuries is the principal trouble, as an injury to the deep parts need not be apprehended when my quantities and intervals are observed. Besides, no one can foretell whether or not an eczema is easily amenable to roentgen treatment. If, in the latter case, the medium rays have failed, the question comes: what can hard rays do now? An answer to this query will be supplied by the two cases which I wished to discuss separately.

Both had chronic eczema which could only be improved, but not cured in spite of numerous applications of unfiltered rays. The filtered rays, while effecting a further improvement, were unable to cure the affection rapidly. These cases do not prove much owing to their small number, but they seem to show that unfiltered rays render the tissue less receptive to filtered rays. This is only a hypothesis, for which I am unable to

furnish an explanation. It does not justify the conclusion that filtered rays do not perform better service than unfiltered ones; but it does reiterate the necessity of commencing the treatment with filtered rays.

Admitting that with the use of filtered rays, the quantity absorbed in the skin until a cure is effected, is in the majority of cases smaller than with the use of medium rays: what is the explanation? This is contained in my repeated assertion, which is faultlessly supported by the experiments of Hans Meyer and Ritter, that the differences between the soft and hard rays do not consist solely in power of penetration, but also in their biological nature. Hard rays are of biologically greater efficacy. Formerly, the fact of very soft rays exerting very rapid effects upon the skin was misinterpreted as greater efficacy, instead of explaining it by smaller power of penetration.

I fully maintain my old standpoint in regard to acute eczema which should be excluded from roentgen treatment. This applies also to filtered rays. I had a distinct exacerbation in one case which I had subjected to them experimentally. This result is intelligible in view of the irritated condition of an acutely eczematous skin. I also deprecate the combination of roentgen treatment with ointments, as the latter do not accelerate the effect in any way. Patients who are partial to ointment protection may be given a harmless preparation. Water and soap should be avoided as far as possible, but this injunction need not be persisted in.

The diagnosis can be easily made in most cases. If the eczema is due to metabolic changes, the *x*-ray treatment must be supported by vigorous general treatment. The affection may be mistaken for syphilis and vice versa, as will be seen from the following 2 cases.

Case I.—Patient states that the affection in the palmar surface has existed for 5 years. Dermatologists made a diagnosis of eczema and instituted prolonged ointment treatment without the slightest effect. I made a Wassermann test which proved strongly positive. Two injections of salicylate of mercury sufficed to remove the "eczema" of 5 years' standing.

Case II.—Patient was admitted with diagnosis of chronic eczema of the right palmar surface, made by a dermatological expert. Coinciding with the diagnosis, I rayed accordingly. After one series of treatments had been applied, the affection was removed which had been unsuccessfully treated by 2 dermatologists for 4 years. However, a violent reaction set in after 5½ full doses. This soon disappeared, but after a relatively short time there was a relapse which after transitory improvement under roentgen rays underwent a considerable change for the worse. A Wassermann test was made with strongly positive results, and specific treatment was instituted.

This case is not only of interest because of the mistaken diagnosis but also because it shows that a syphilitic affection may be favorably influenced by roentgen rays though only transitorily—which by the way is nothing new—and finally that 2½ doses are capable in spite of small applications of producing a violent reaction.

Conclusion.—I hope to have shown that the administration of filtered hard rays in chronic and subacute eczema is considerably superior to medium rays, in that they induce a safer, more rapid and more dependable cure with no increased but probably decreased danger of skin reaction. This is probably due to greater biological efficiency of the hard rays. The favorable result may possibly be achieved still more rapidly by applying thicker filters and smaller intervals. At any rate, there is no longer any justification on the ground of the experiences gathered in the treatment of eczema and other skin affections, in designating 7-7.5 Wehnelt the most suitable rays for dermatological affections, and it is desirable that dermatologists would recognize the fact.

Generalized Osteofibrosis with Tumors and Cysts* (*v. Becklinhausen's Disease*), *being also an Experimental Contribution to the Etiology of Bone Cysts. **Lotsch. (Abstr. from Arch. f. Chir., Vol. 107, in the Berl. klin. Wchnschr., 1915, Sept. 13, Vol. LII, No. 37, p. 981.)**

The article contains a compilation of the literature with pathological and autopsic details. The pathological picture shows transition stages into various other chronic affections of the skeleton, such as rachitis, osteomalacia and senile osteoporosis. Virchow has established the fact that cyst formation in the bone is never the primary and material occurrence, but that all cases of this kind are to be regarded as transformation products of former solid transformations. The pathological picture is not yet quite cleared up, but all investigations point to the probability that there has been originally a proliferating and destructive fibrosis of the bone marrow. The normal fat, or the hematopoietic fat, as the case may be, is displaced by a proliferation of the connective tissue stroma. The proliferation of the fibrous marrow causes coherent, tumor-like fibrous masses (fibromata). This proliferation or the formation of localized giant cell sarcoma is often followed by regressive changes in the shape of softening cavities. The affection always sets in with circumscribed foci of the various bones. Spreading and confluence of the same later cause the entire bone to be permeated, which thereby loses its firmness, becomes flexible and soft enough to be cut. In due course there are thickening, distention, bending and fracture of the bones. Favorite seats are the vertebral column, cranial base, pelvis, long tubular bones, especially the upper third of the femur.

Clinically, the affection is characterized by dull, tearing articular pains, which are often designated as rheumatic. This is followed by spindle-shaped distention, curving and pathological fractures of some or of all bones, and patients must take to their beds.

According to the roentgen examination, the periosteum is not involved, the bone structures in the porous parts are honeycombed and of a cotton-like appearance; the lime content is considerably reduced and the bones are highly permeable. At places where the disease has progressed, there are light round spots, quite free from bone substance, usually sharply demarcated, with or without dividing septa. Histopathologically, there is a kind of bone disintegration due to lacunar resorption. The giant cells of bone marrow contained in Howship's lacunæ of the resorbing surfaces must be credited with an osteoclastic capacity, and the protoplasm is found to contain lime inclusions. Side by side with the osseous disintegration, there is a new formation caused by the osteoclasts which on their part abundantly supply osteoid tissue. The principal and only changes take place in the bone marrow.

Cyst formation in the bones also occurs in other affections, such as intraossal tumors (enchondroma, sarcoma), infectious disintegration of bones (osteomyelitis, tuberculosis, syphilis, actinomycosis), in other disturbances of the tissue equilibrium in the bones (arthritis deformans, rachitis, osteomalacia, senile osteoporosis in the callus). In rachitis, arthritis deformans and senile osteoporosis, the hollow spaces are always quite small; the cyst formation in osteomalacia is more or less part of the pathological picture of ostitis fibrosa; and the other hollow spaces can hardly be called cysts in the ordinary acceptation of the term. Thus, there are only the formations of ostitis fibrosa left of the softening cysts. The name "bone cyst" thereby acquires a certain distinguishing significance. The hollow space must have a certain size. The inner surface of the wall must be smooth, seroid and glistening. The wall itself is often recognizable as a special membrane and by its

whitish color is often recognized as fibrous connective tissue; the contents are serous or tinged red from admixture of blood. Marrow fibrosis is often macroscopically demonstrable in the vicinity. The complete cyst presents itself as a uniform or confluent cystoma in a multilocular hollow space in the bone. Growth of the cystic hollow spaces is only probable in relatively young cysts, while older cysts with tough connective tissue walls, which have few vessels, appear as a finished product.

Etiologically, v. Recklinghausen himself mentions the inflammatory genesis which, however, is not proved, and doubtful. There is no doubt, however, that there are noxious factors which affect the entire osseous system through the circulation. A direct bacteriological cause appears very improbable. The glands with internal secretion have likewise been suspected as the cause, but neither castration nor ovariotomy has had a favorable effect upon the disease, for the simple reason that the latter is merely a disturbance of the entire internal secretion following impairment of the general condition. Nothing more definite is known on the subject as yet. The traumatic origin is not proved and should be considered with the greatest caution. After these very uncertain statements on the etiology of ostitis fibrosa, the experimental way does not point to satisfactory results either. So far as the cyst is concerned, investigation may show whether traumatic injuries of the bone marrow heal with cyst formation. The author made some such experiments upon rabbits. The tibia was trephined with a small drill and the bone marrow squeezed out. The drill hole was filled with tissue or wax. Besides the simple evacuation of marrow by physiological salt solution, the author tried to produce a permanent irritation in the marrow cavity by the introduction of foreign bodies in solid and fluid form. The result of these experiments was that not in a single instance a cystoid hollow space was formed. With this result before us, the purely traumatic origin of the bone cyst may be discarded.

The Legal Aspect of Roentgen and Radium Injuries. **Kirchberger (Berlin). (Deutsche med. Wchnschr., 1915, July 15, Vol. 41, No. 29, p. 872.) (Ref. Ergänzungsband 32 Fortschritte.)**

This book is valuable to physicians practicing roentgen and radium therapy, because it is intended to protect the profession from civil or criminal actions which have of late become particularly numerous in this specialty. The first chapter deals with the causes of action (principally negligence) and the civil and criminal responsibility of the physician; also with the physician's protection in the shape of insurance, compensation, waiver, consent. The second chapter deals with the details of the injuries. The third chapter contains a number of interesting cases of such injuries, one of which being of general interest, is here repeated:

A patient had been treated with roentgen rays for herpes zoster. After a time, the physician stopped the *x*-ray, but continued inunction treatment. Patient, however, deceived the physician's nurse, making her believe that the *x*-ray treatment was to be continued. He thus obtained the same from her with the result of serious injury. An action for damages was instituted, judgment being obtained against the defendant, because he had failed to provide against the misuse of his roentgen apparatus. On appeal this judgment was reversed, the court holding that it was going too far to hold a physician responsible for this kind of occurrence. He had to spend a large part of the day outside his institution, and after examining a new patient, the assistants were instructed in the details of the treatment, the latter being superintended during the first applications. In this particular method of treatment frequent repetition was neces-

sary which was always alike and consisted of purely mechanical manipulations, the execution of which being entrusted to competent assistants, could not be made subject to verbal or written instructions for each individual treatment. Just as little could the physician be expected to keep his roentgen apparatus under lock and key.

Sudden Death of a Child Under X-ray Treatment. **P. Cosima Blinda, Milan. (Giornale di Elletricita Medica, Sept.-Oct., 1913.)**

Patient, 2½ years, suffering from trichophytosis, was admitted to the Civil Hospital for *x*-ray treatment. The physician being absent, a nurse applied the treatment, during which the child suddenly died. The case was taken into court, and the author had to give his opinion in how far the death was connected with the *x*-ray. At autopsy, the author found a highly hypertrophied thymus containing 3 large cavities filled with mucopurulent fluid. Although cases of sudden death in thymus hypertrophy are numerous, authors are not agreed as to the way in which death is caused, most of them, however, assuming that the cause is mechanical compression. The author therefore concludes that death in the present case is not due to the effect of the *x*-ray, but to the presence of a hypertrophic thymus which had possibly assumed an unfavorable position during the *x*-ray manipulation. This shows the desirability of the presence of a trained specialist in *x*-ray treatment.

On Roentgen Sterilization. **L. Goerl, Nuremberg. (Berl. klin. Wochenschr., 1914, 47.)**

Goerl, who was the first to report on successful roentgen sterilization, gives a survey on the development of roentgen therapy in myomas and uterine hemorrhages. In his work he inveighs chiefly against the Freiburg method of small-field-radiation from practical and theoretical reasons, holding that for the requirements of the practitioner in the affections referred to 5-6 entrances (3 abdominal and 2 sacral) are sufficient. It should also be mentioned that he uses Sabouraud pastilles, experience having shown that the results of Kienboeck's strips may differ to the extent of 50 per cent. in the hands of the same operator.

Sterilization in the Interests of Race Betterment. **A. Hegar Wiesloch, Baden. (München Med. Wchnschr., 1913, 15.)**

In the matter of artificial restriction of fertility the state can permit only very definite and distinctly limitable exceptions. These exceptions do not include sterilization from social motives, which means that adverse connubial or economic conditions (excess of children in poverty, etc.) form under no circumstances a valid reason for sterilization.

Criminality likewise is excluded. The author's statistical investigations, made upon the material of the Wiesloch Heil-und Pflegeanstalt, show that, if forcible sterilization of insane lawbreakers were allowed, as in some parts of the U. S., there would not be any appreciable diminution of the number of inmates in prisons and asylums, because the progeny of these degenerates is exceedingly limited.

Conditions are different in the question of preventing conception in women suffering from dementia præcox and epileptica, and similar affections, who have been kept in institutions for a considerable time and must be tentatively liberated. The author found in a large number of instances that these women often return a short time afterward in a pregnant condition. It is certain that children born by insane mothers have a disastrous heredity and must be regarded as damaged in the nucleus, it being a well known fact that the development of a child is absolutely dependent upon the ante-partum

condition of the mother. A child of an epileptic woman which may have been conceived between paroxysms and undergone uterine development during paroxysms, usually has a tragic fate in store. It might be objected that patients of this class should not be discharged until completely cured, but it is against the law to retain patients, whose watching and nursing is provided for, indefinitely in an institution pending a cure which in most cases of psychosis is problematical. Finding that instructions given to the husbands of these women are useless and that artificial abortion in view of the fertility of the mothers is only a temporary makeshift, these patients should be permanently deprived of the power of procreation.

This indication for sterilization which is primarily based upon motives of race betterment, is supported by a number of secondary reasons: Renewed pregnancy is usually associated with increased psychotic manifestations and a mother with an inferior psychology should not be burdened with increased troubles, lest her condition take an unfavorable turn.

Dosage of Roentgen Rays. **R. Kienboeck. (München. Med. Wchnschr., 1914, 2.)**

K. says that dosage with the quantimeter is only reliable if his instructions are most conscientiously observed. Otherwise there may be considerable mistakes. These instructions are herewith repeated and refer to the composition of the developer, temperature of the developer, time of development, method of drying and reading of the scale. Failure to observe any one of these points may be a source of error.

The development of the test strip is done in a certain mixture of 18° C. for a certain number of seconds. Every test strip is accompanied by a statement how the developer is composed and how long the development is to last. During development, the developing vessel should not be kept in the hand, lest the temperature be raised by the heat of the hand, causing the test strip to indicate wrong values. The test strips have to be immersed vertically into the fluid and constantly, but not rapidly, moved to and fro. The eyes should be kept constantly on the watch.

One developer should not be used for too many strips, nor should it be left uncovered for a length of time. If, for instance, only a few strips have been developed in 200 c.c. of developer, the solution may be used again for more strips after a few hours, but it should not be kept uncovered over night, as it would be weakened by the access of air.

When removing the strips from the protecting paper caps, they should not be soiled, nor placed on a wet table, nor taken up in the middle with a wet finger, as otherwise a large part of the sensitive layer would be injured. Previous to development, all vessels and clamps should be carefully cleansed.

The strips, after watering, should not be dried in warm air, as this would give them a dark hue.

When reading the doses off the scale, the determination of the blackening degrees must be carefully made. Illumination should be sufficient. Strips and scale should lie in the same plane. By leaving a small space between the strip and the scale, small differences of blackening can be recognized.

Mistakes may occur in the mixture of the developer or in carrying out the development, or the quantimeter paper may be kept at an unsuitable place and suffer from noxious vapors. Kienboeck has therefore devised a glow light control, by which mistakes of this kind can be avoided and which is described in Vol. I of Strahlentherapie.

The important point in deep *x*-ray therapy being the determination of large doses above 10 X, the question is how these doses can be measured. The test strips assume a very dark discoloration during development with ordinary normal doses. In order to determine even larger doses with the quan-

timeter, the test strips are best changed several times during the *x*-ray treatment, just as the Sabouraud pastilles are frequently changed in heavy rays.

If the efficiency of a roentgen tube is to be tested on the phantom, it makes a difference how the phantom is constructed. For instance, the test strips will show lower values when a phantom with a broad surface is used, than with a narrow surface. This is probably due to the broad surface keeping back the secondary radiation of the air.

If the phases of different roentgen rays are to be compared with each other, the identical phantom must be used.

Roentgen Rays and Eugenics. **Max Hirsch. (Zeits. f. Aerztl. Fortb., Nov. 1, 1914.)**

Hirsch objects to the use of roentgen rays in chlorotic young women, considering the same premature in the light of our present knowledge, and not permissible for eugenic reasons. Roentgen rays, like alcohol, syphilitic virus, lead, mercury, nicotine and other substances, are a germ poison. Their effect in relation to the kind and grade of cell and their pharmacodynamic properties are not sufficiently known to justify their use in the treatment of germinal glands, as recommended by Fränkel.

Roentgenography of Uric Acid Calculi. **C. Thurstan Holland. (British Medical Journal, October 23, 1915, p. 624.)**

Holland doubts a statement by Newman, in a recent article on ureteral calculus (*British Medical Journal,* October 16, 1915, p. 557) that "It (radiography) is now so well developed that even a small uric acid stone in the lower segment of the ureter can easily be discovered." Holland's experience of the last ten years is that he has never yet been able to show, with the *x*-ray, the shadow of a pure uric acid calculus anywhere in the urinary tract.

The description of "uric acid calculus" from the *x*-ray point of view must necessarily mean "pure" uric acid, as the point is whether the uric acid, and not other constituents of the stone, casts the shadow.

Some years ago Mr. Thelwall Thomas had a number of stones examined both qualitatively and quantitatively; a number of these to the eye suggested uric acid stones. Not one of these was found to consist of uric acid, and many had no uric acid in them at all. On the other hand, in several cases of large bladder stones not shown on good roentgenograms, the examination showed them to consist entirely of uric acid and moisture, without a trace of any other constituent. It is impossible to conceive of large uric acid bladder stones not showing, and small lower ureter stones being "easily" discovered.

Holland has never yet seen a stone shown by the roentgen ray examination, removed by operation, and properly examined, which consisted of pure uric acid. He has not, during the last ten years, seen a stone removed from the kidney or ureters which had not thrown a distinct shadow on an *x*-ray plate.

Extraction of Foreign Bodies. **J. R. Caldwell. (British Med. Jour., Aug. 28, 1915, p. 322.)**

Since the commencement of the great European war, there have been developed many new modifications of the methods of localizing foreign bodies. Such an expenditure of energy in the planning of this enormous number of new methods was in response to some weakness in those systems in existence previous to the present struggle. Of paramount importance in work of this nature is the question of speed; simplicity is essential, as work may have to be done under most adverse conditions and with any ordinary apparatus.

The rock bottom principle of localization is practically the same in all systems; the

main difference lies in the mode of application. The *x*-ray tube is in position under the table, while above is the screen. The essential of localization resolves itself into a geometrical calculation. We know the distance of the target from the surface of the patient's body, the tube is shifted a known distance, and the apparent distance travelled by the foreign body on the screen is noted. Given these three measurements, it is obvious that the extent of the movement of the shadow on the screen will depend absolutely on the depth of the foreign body. The nearer the foreign body to the screen, the less will be its apparent movement.

In war work, the operating table and the *x*-ray table should be combined. During the past few months, Caldwell has been permitted to treat on the *x*-ray operating table over 350 cases involving the removal of a foreign body from the tissues. Shell, shrapnel, bullet, and hand grenade have been removed with facility and speed which comes with experience. But in no case from the first, in which an attempt was made, has a failure been recorded. As many as thirteen pieces of shell were removed from one patient.

The table consists of the ordinary type with a large tube-box underneath, giving transverse and longitudinal movements. The top used for operations is of thin, well-polished wood. The high tension wires approach the tube-box from the end that operations may be performed from both sides of the table. Sufficient light for minute dissection was furnished by using an old automobile headlight above the table, with a powerful condenser, concentrating the light only upon the field of operation, while the remainder of the room was left in comparative darkness. A blue glass over the light improves it for *x*-ray purposes. In the event of an anæsthetic being required, the anæsthetist may be equipped with a small pocket lamp, also giving a blue light.

In such work protection of the operator is of paramount importance. In addition to the protection on the tube-box, further safety is afforded by the use of a little screen hung on the front of the table between the box and the operator. Operations are always performed with the smallest diaphragm possible. To afford still greater protection, lead plates three millimeters in thickness and with circular openings in the center varying from one to four inches in diameter, laid upon the table, serve to cut off stray rays. These lead plates are readily sterilizable.

Long, slightly curved Spencer Wells forceps are used in the extraction. The hands are further protected with two pairs of gloves to be worn during the operation on the *x*-ray table, an outer thick pair, such as are worn by housemaids, and an inner thin pair of the ordinary type. The outer pair can be removed on the completion of the actual extraction or to permit of delicate work.

Roentgen Epilation in Practice. **Fritz M. Meyer, Berlin. (Abst. from Med. Klinik, Oct. 10, 1915, Vol. XI, No. 41, p. 1130.)**

1. Filtered rays come in for consideration exclusively for roentgen epilation, because their toxic and therapeutic doses diverge in practical application.

2. In cases where no epilation is desired, the greatest caution in the application of rays is indicated, because the susceptibility of the hair follicles in a pathological skin is considerably increased. Roentgen treatment of the scalp should therefore be considered only after all other means have failed.

3. There is no way of foretelling the occurrence of epilation, although it may take place upon application of very slight doses of roentgen rays. Nor can the time be predicted when hair will reappear.

4. If there is a growth of hair in the

vicinity of the field of treatment which is to be preserved, it should be scrupulously protected.

5. The treatment of partial loss of hair with roentgen rays is to be deprecated, it being impossible to determine the exact dose of irritation.

6. The increased effect of filtered rays upon the hair follicles is explained not only by their greater deep-effect, but also by their biological properties.

Roentgen Therapy of Tubercular Lymphoma of the Neck. **Fritsch, Breslau. (München. Med. Wchnschr., 1914, 47.)**

The technic and method of raying tuberculous glands have been chiefly worked out by Kienboeck, on whose authority the author principally rests. The area to be rayed must be made accessible in a sufficiently large circumference, because often the germs of new lymphomas are located in the neighborhood of a pathological region. He uses hard tubes, filtration with aluminium, glass or leather, focus-skin distance of 20-30 cm. The dose generally is 1 Sabouraud, in fistulous skin ⅔ or only ½, which is repeated every 3-4 weeks, until the lymphoma has disappeared. As in the majority of cases two to four treatments are necessary before improvement sets in, patients' attention should at once be directed to the fact that the treatment will take a long time, at least six months.

In the course of one year, 33 patients were treated with this technic at the Breslau Surgical Clinic, with the following results:

The most favorable results were shown in cases which were not too far advanced, such as nodules of different sizes in children and young individuals. They frequently undergo diminution after a single powerful treatment. Foci are dissolved into separate nodules which generally grow smaller and finally disappear with the exception of a connective tissue remnant. If the lymphoma is older and the surrounding tissue infiltrated, the skin reddened, and the foci can no longer be demarcated, the conditions are unfavorable for radiotherapy. One treatment is never sufficient in these cases, but after continuing intense treatment for about six months, the inflammatory manifestations will gradually recede, while the various foci commence to become demarcated. In this progressive stage there are very often abscesses and softening. The former have to be evacuated by stab incisions. Fistulæ need not be apprehended, the further progress taking a regular and satisfactory course.

If the lymphoma comes under treatment at a still more advanced and fistulous state, the prognosis is correspondingly worse, because such a skin will not bear strong rays. Nevertheless, a favorable influence of the *x*-rays cannot be gainsaid.

The fistulous secretions assume a very serous character, the fistulæ get covered with a dry scurf, and there is an increasing healing tendency. In this way the skin becomes invigorated so that the intense doses may gradually be increased. The scars growing over the perforations or incisions are not very deeply retracted and not thickened like keloids, so that cosmetically good results may likewise be expected.

The prognosis is very bad in generally tuberculous individuals who exhibit symptoms of pulmonary or intestinal tuberculosis, aside from lymphoma. Although these patients should not be altogether excluded from *x*-ray therapy, no improvement has been noticeable in any of these cases.

Of 20 cases which the author has subsequently re-examined (and only these may be considered), there were 8 cured and 10 materially improved. But as the treatment of the improved cases is being continued, some of them may have to be added later to the cures. In one case there was a relapse, and one died of general tuberculosis.

Radiotherapy has many advantages over

operation. The patient is spared a sometimes difficult operation under anesthesia, which is an important matter in individuals with a tubercular disposition. There are no disfiguring scars, the multiplication of which renders patients unhappy at each successive operation, especially young women. The treatment can be carried out without interruption of occupation, which will compensate for the only disadvantage of the treatment, consisting in its long duration.

Filtered Rays in Skin Diseases. Dr. Fritz M. Meyer. (Berl. kl. Woch., Oct. 18, 1915, vol. 52, No. 42, p. 1095.)

In spite of the fact that the advantages of deep roentgen therapy are now firmly established, the majority of roentgenologists can not make up their minds to substitute the same for the medium soft rays, and the author attributes this to the fact that the application of deep rays involves the acquisition of a new technic and new apparatus. He describes his experiences in this respect and explains the effect of the deep method upon eczema, psoriasis, lichen, acne vulgaris, furunculosis, buboes, nevus angiectodes, favus, trichophytosis, microsporia, hypertrichosis and epithelioma.

He attributes the better effect of filtered rays to two principal reasons: (1) difference in quality aside from quantity; (2) the possibility of applying large quantities in rapid succession. The advantages are summarized as follows:

a.—In many skin diseases, the results are more rapid and more positive. In every chronic affection it is of importance to succeed rapidly and with such quantities of rays as will cause comparatively little injury to the skin, as the sensitiveness of the latter increases with repeated applications.

b.—The treatment is successful in skin diseases where other treatments have failed or where the results were obtained at the expense of serious roentgen injuries.

c.—The danger of reactions is considerably reduced and almost eliminated.

d.—The very rare reactions run a mild course.

e.—Larger surfaces are reached in one treatment owing to the larger tubes which are required in filter therapy.

f.—The possibility of using stronger currents renders it possible to apply the intended quantity of rays in a shorter time.

g.—The scrupulous protection of the skin which is necessary in the old method and constitutes a loss of time, may be disregarded in nearly every case where small doses are applied.

h.—There are no longer two different systems, one for surface and one for deep treatment. The technic for both is now the same, and the difference is merely one of quantity.

X-ray Treatment of Menorrhagia, Menorrhea and Uterine Myoma. Sidney Lange. (Lancet-Clinic, December 11, 1915, vol. CXIV, No. 24.)

Lange reports on a series of fifty consecutive cases of menorrhagia and uterine fibroids treated by means of the *x*-ray. The technic was considerably simplified. Only four ports of entry were used, two anteriorly and two posteriorly, each about three inches square, so that the divergence of the rays would be sufficient to strike both ovaries at each exposure, no matter what position the ovaries may occupy. This method reduces the time occupied by each treatment, and the amount of post-irradiation toxemia is minimized. The Coolidge tube was used, backing up a nine to nine and one-half inch parallel gap. The filter consisted of three millimeters of aluminum and a piece of thick sole leather. At six inches distance, twenty-five milliampere minutes were given through each area, thus delivering a total of one hundred milliampere minutes, or as it proved to be, 80 to 100 x at each treatment.

In order to economize time, Lange passes ten milliamperes through the tube for two and a half minutes at each dose. No burns have developed. The pubic hair has been carefully protected, and has not been lost in any case. Dodd's alkaline lotion has been prescribed as a daily prophylactic measure throughout the entire course of *x*-ray treatments, whether the skin showed any irritation or not.

In this series of fifty cases, nineteen were treated because of persistent menorrhagia. The ages of the patients varied from seventeen to fifty years. The minimum of *x*-radiation required to bring about a permanent menopause was one treatment (100 x), in a woman of forty-nine. The greatest amount given any patient was 800 x (eight treatments), which was required to abolish the ovarian function in a girl of twenty. Another patient of seventeen years of age required only 700 x to accomplish the same result. A woman of twenty-eight required 600 x (six treatments). A woman of thirty-five required 500 x. With increase in the age of the patients the amount of *x*-radiation required to abolish the menstrual flow rapidly decreases. Thus patients around forty-five and fifty years 100 x to 400 x (one to four treatments), usually sufficed.

Lange finds it a safe working rule that if one period is missed, all treatment may be discontinued, for it is almost certain that even if there is an occasional showing, permanent cessation of menstruation will finally result.

Lange has recently produced what seems to be a permanent menopause in two girls, one of seventeen and one of nineteen years of age. In the case of the seventeen-year-old girl, twelve months have passed since the treatment and there has been no return of the menstrual flow. It therefore seems not too radical, according to Lange, to assert that the menopause can be brought about by the *x*-ray in any menstruating female, whether she be thirteen or fifty years of age.

The contra-indications for treatment are particularly malignancies and inflammatory pelvic conditions, such as pus tubes. The difficulty of selecting cases and excluding the possibility of malignancy is the only criticism that can be directed against this method. A review of the literature fails to reveal any recorded case of malignancy developing in the remnants of fibroids which have been previously subjected to *x*-ray therapy. It is indeed inconceivable that a malignancy should develop in tissue which has been thoroughly sclerosed by roentgenization.

The presence of an inflammatory pelvic condition is the most common cause of failure of the *x*-ray to produce the desired results; it is also the most common cause of recurrence of symptoms following the supposed cure.

The Recognition of Pleural Disorders by X-rays. **Percy Brown. (Bos. Med. and Surg. Jnl., Nov. 25, 1915, vol. CLXXIII, No. 22.)**

The paper discusses only pyogenic infections of the pleura. Although only occasionally is the condition difficult of recognition by clinical means, yet the *x*-ray is valuable as a means of recording the extent of the process, disorders in neighboring organs, and the progressive effect of appropriate treatment. In the acute or subacute pleural disorders, fluoroscopy is more valuable than plate or film record. Especially in the study of an effusion, fluoroscopy alone enables us to deduce its composition by observing its readiness to comply with hydrostatic laws. Fluoroscopy, as well as radiography, is therefore desirable in many cases.

The objection that fluoroscopy disturbs patients who are acutely sick is not tenable, for it is no more disturbing than a thorough investigation by auscultation and percussion.

Portable fluoroscopic devices are needed. Roentgenography is of special value in subacute or chronic cases in order to observe the progress of treatment or when the variant dispositions of effusion are to be recorded. The proportion of serviceable lung tissue beneath rigid chest walls is easily determined with the *x*-ray. Rarely is the cardiac shadow lost behind that of an effusion, while it will be visible through the most dense organized exudate. Much information is afforded with reference to the phenomena of resolution, absorption, expansion and general or partial resumption of the normal function.

Three cases are cited, illustrating the value of subsequent examinations and other permanent records. These reliable comparative records can only be obtained by the *x*-ray.

The Roentgen Ray Diagnosis of Gastric Lesions. **J. W. Squires. (N. Y. Med. Jnl., December 18, 1915, vol. CII, No. 25.)**

This is a profusely illustrated article reviewing in some detail the accepted facts concerning the roentgen diagnosis of gastric ulcer and carcinoma. The article presents nothing new, but is of value in urging the indispensability of the roentgen examination in differentiating medical and surgical lesions. The more frequent employment of the roentgen method will result in the early detection of many lesions which at present are discovered only when far advanced.

A Few Radiograms to Illustrate the Velocity of the Rifle Bullet as the Determining Factor in the Extent of an Injury. **George Vilvandre. (Arch. of Radiology and Electrotherapy, Nov., 1915, No. 184.)**

Vilvandre believes that the damage done by rifle bullets depends upon the velocity of the missile rather than on the texture of the bone. Five cases were cited:

First, a "dead" missile. The second, going at a greater velocity, yet not sufficient to perforate the bone completely, but settling comfortably at the end of its burrow. The third pushed everything in front of it, causing extensive damage. In the fourth and fifth cases, the highest velocity caused the bullet to perform the work of a clean, sharp punch.

Fluorescent Screen Localization by the Parallax Method. **Alfred C. Jordan. (Arch. of Radiology and Electrotherapy, No. 184, November, 1915.)**

The following are the requisites for the method:

1. A couch with a tightly stretched canvas top (or a wooden top).

2. A thoroughly protective tube-box with an adjustable rectangular diaphragm and a convenient method of moving the tube-box in a horizontal plane in the longitudinal and transverse direction of the couch. This movement of the tube-box is carried out repeatedly while the tube is excited; hence the necessity for special protection.

3. It is absolutely essential to have an arrangement whereby the operator is able to control, by a touch of the foot, both the current through the *x*-ray apparatus and the light in the room. A double foot-switch enabling this to be done can be added to any installation.

4. Fluorescent screen work in war injuries involves frequent examinations at close quarters, and no tube-box is so completely protective as to absorb all *x*-rays issuing from a tube actuated by a powerful generator; therefore, I consider it necessary for the operator to interpose a lead-lined screen between himself and the couch.

5. Protective spectacles and sufficiently protective gloves are considered necessary adjuncts. Also a good quality of lead glass to cover the fluorescent screen.

A special localizing device made by Watson is required for use in connection with this method. This localizer is illustrated and described in the article.

Jordan believes that there are very few cases in which the localization of foreign bodies can not be carried out accurately and quickly by the parallax method with the fluorescent screen alone, while further, the screen examination renders formal localization unnecessary in many cases.

***Roentgen Treatment of Cancer* (*Om Roentgenbehandling af ondarede Svulster*). S. and J. Nordentoft. (Ugeskrift for Laeger, Copenhagen, August 26, vol. LXXVII, No. 34.) (Abstract through Jnl. Am. Med. Ass'n.)**

Nordentoft reports the further history in twenty-four cases of cancer in which courses of roentgen treatment were applied one or more years ago. He emphasizes that a person who has had a cancer removed, or cured by other means, must keep in touch with his physician afterward, realizing that he must be kept under sharp observation for all the rest of his life. Nordentoft makes a point of continued supervision and publishes from year to year the present status of the more interesting cases, omitting superficial cancers and recurring mammary cancers. In this communication he presents evidence that cancer of the mouth and tongue may yield surprisingly quickly to roentgen treatment, also that metastases of malignant diseases are liable to retrogress under the roentgen rays.

The series reported here include only the cases in which roentgen treatment has conquered new fields, namely, cancer starting in the mucosa of the mouth or vulva, or deep-seated cancer, as in the pelvis, abdomen, chest or brain, or cancer of the esophagus or rectum. Even in the absolutely hopeless cases, marked benefit was apparent for a time. This was particularly striking in a case with metastasis in the lungs from cancer elsewhere. Among the patients still in good clinical health are one man of 45 with a sarcoma in the mediastinum (the last course of roentgen treatment was given in 1911); one woman of 64 with recurring cancer of the vulva (last treatment 1913), and several with cancer of the mouth. He also gives the details of cases which proved absolutely refractory to the rays, including one of cancer of the lung. The necropsy findings are also given in the cases that have terminated fatally after the roentgen treatment or the patients have finally succumbed to intercurrent disease. The cases are listed serially for this report. The following yearly communications will carry on the history of each surviving patient under the same serial number. In time the data thus accumulated for each individual case, as the years go on, will supply a basis, by comparison, for general conclusions, as to the efficacy and technic of roentgenotherapy in malignant disease. He urges others to carry on similar series, reiterating that a patient cured of cancer should never be allowed to forget the need of perpetual medical supervision to detect recurrence or metastasis in its incipiency.

***Acute Bone Atrophy after an Accident* (*Akute Knochenatrophie nach Unfall*). Wilde. (Zent. f. chir. u. mech. Orthopädie, Sept., 1915, p. 196.)**

A coachman was struck by a wagon pole on the right foot. Pain was not prominent at first, but later he began to limp. Nothing was found on examination. Roentgenogram showed irregularities of three tarsal bones with evidence of periostitis. A later examination was negative. Fracture, traumatic tuberculosis and arthritis deformans were excluded and the diagnosis was made of acute bone atrophy following traumatic periostitis. The bone atrophy was estimated at 50%. R. H.

An Intraosseal Hygroma (*Ein intraossales Hygrom*). P. Frangenheim. (Zent. f. chir. u. mech. Orthopädie, July, 1915, p. 159.)

Description of a case in which a hole the size of a walnut filled with mucoid material was found behind the bursa on the internal malleolus. Histological examination of the cyst wall of the bone showed hygroma. Von Bietski has previously described an intraosseous hygroma of the occipital bone, which was, however, due to a different process.

R. H.

Gunshot Injuries in the Roentgenogram (*Schussverletzungen im Röntgenbilde*). Hagedorn. (Zent. f. chir. u. mech. Orthopädie, August, 1915, p. 174.)

The author attempted from a large number of roentgenograms of gunshot injuries to ascertain how the bone injury occurred and especially with what regularity. In injuries of the shafts, the greatest splits and displacements entered the medulla; from this location the fissures and splits extended outward longitudinally, the fragments being slightly displaced. The wound of entrance is small and smooth; that of exit shows cortical triangular splintering. He enumerates the gunshot injuries of different bones, without reaching definite conclusions. A further investigation of this subject is planned. R. H.

Fractures of the Head of the Femur (*Die Frakturen des Femurkopfes*). Holbeck. (Zent. f. chir. u. mech. Orthopädie, July, 1915, p. 151.)

Fractures of the head of the femur are rare. The author collected five cases from the literature and one of his own, which occurred in an old peasant woman who fell from a high ladder. The diagnosis is often difficult, and his case was called a dislocation after the first roentgen plate, until further examination showed crepitus present. The prognosis is generally unfavorable, for the great force necessary to produce a dislocation often causes fatal secondary injuries. Treatment consists in reposition, usually by open operation and nailing the fractured parts. R. H.

Free Bodies in the Knee Joint with Especial Reference to So-called Osteochondritis Dissecans (*Zur Kenntnis der Entstehung von freien Körpern im Kniegelenk, mit besonderer Rücksicht auf die sogen. Osteochondritis dissecans*). Troell. (Zent. f. chir. u. mech. Orthopädie, July, 1915, p. 158.)

The author gives observations of four cases of chondral and osteochondral joint bodies, in two of which trauma played a rôle. In one case there was a general breaking off of a part of the joint skeleton, the so-called Osteochondritis Dissecans, without injury to the upper joint surfaces. It occurs generally in the young between 20 and 30 years of age. Important symptoms are: pain on full extension of the knee, and bending. The condition is not one for conservative treatment, but as soon as the diagnosis is made by roentgenogram, operation should be performed. R. H.

Roentgenograms of Gunshot Wounds (*Röntgenbilder bei Schusswunden*). G. Klein. (Zent. f. chir. u. mech. Orthopädie, August, 1915, p. 174.)

Klein reports cases in which the roentgen examination gave surprising results. A wound in the breast muscles showed wounds of entrance and exit which healed well, although a shell had carried in a piece of uniform cloth. In one man the wound of entrance was on the right hip, but no wound of exit was to be seen. There was pain in the thigh and knee. The shell was not probed for, but accidentally it was shown by the roentgenogram under the left os pubis

where no pain was felt. One patient had a contusion of the left leg and complained of great pain. Nothing was to be found clinically and simulation was thought of, when after repeated roentgenograms a fine transverse fracture of the tibia was made out. In gunshot injuries of the foot and hand where great swelling renders clinical diagnosis very difficult, the roentgenogram is very necessary. Great caution is necessary to avoid errors in localizing bullets.

R. H.

***Bone Changes in Neuritis* (*Knochenveränderungen nach Neuritis*). Finkelnburg. (Zent. f. chir. u. mech. Orthopädie, Sept., 1915, p. 195.)**

Four weeks after gunshot injuries with neuritis, roentgen evidence is found in the bones of the fingers, toes, metacarpus and metatarsus, as well as in the epiphyses of the forearm bones. The picture is that of acute bone atrophy, but different from the atrophy of disuse. The changes were very marked in the spongiosa of the finger and toe epiphyses. Finger joints tend to become stiff even when passive movements are begun early. R. H.

***Spur Formation on the Os Calcis and Olecranon* (*Ueber Spornbildung am Calcaneus und Olekranon*). Rolly and Appelt. (Zent. f. chir. u. mech. Orthopädie, July, 1915, p. 163.)**

The author gives his observations in 59 cases of spurs on the os calcis (43 on the lower surface of the os calcis, the rest at the origin of the tendo Achilles) and 5 cases of spur on the olecranon. Trauma is the exciting factor in causing ossification of tendons and spur formation in the presence of osteoarthritic processes. Spur formation is observed more in elderly people in whom there is a tendency to retrogressive changes in tendons following poor tissue nutrition and imperfect circulation. The arteriosclerosis corresponds also with this pathological picture. The diagnosis is completed by the roentgenogram. If conservative treatment such as rest in bed, hot fomentations, thermopenetration,—the last especially useful where the etiology is gonorrheal,—is not successful, the spur, together with all inflamed bursæ, periosteal and connective tissue, must be removed with the chisel to prevent regrowth of the spur.

R. H.

***Callus Formation and Bone Injuries* (*Kallusbildung nach Knochenverletzungen*). v. Hausemann. (Zent. f. chir. u. mech. Orthopädie, Sept., 1915, p. 194.)**

The author combats the prevalent idea that a bone can heal only by means of callus which is produced in excessive amount. Callus formation is even firmer when the bone ends are not accurately approximated as shown by preparations made before the discovery of the roentgen rays. Callus tissue is not as firm as bony tissue and is likely to be influenced by muscle pull; therefore more tissue is formed than is necessary for consolidation of bone. Inflammatory conditions also increase callus formation. Where inflammatory conditions are not present, or where static conditions or the effect of muscle pull are absent, as in skull fractures, the bone heals without callus. Fissure fractures heal smoother the farther they are located from muscle insertions. Fractures of the nasal bones heal without callus.

R. H.

***Roentgen Rays in Treatment of Acne.* Dösseker. (Therapeutische Monatshefte, Berlin, August, XXIX, No. 8.) (Abstract through the Journal of the A. M. A.)**

Dösseker says that he gets best results with repeated small doses of the rays not strong enough to bring about any appreciable reaction in the skin. He finds it pos-

sible, however, to produce about the same effects with the single large dose, which brings about a reaction. There is a resulting modification of the sebaceous glands to such an extent that the tendency to acne dies out. He calls attention to the fact that the usefulness of this agent is greater when the disease is spread over a large surface, with numerous pustules, than in the less disfiguring torpid type.

A Case of Exostosis Cartilaginea Multiplex. **Weber. (Zent. f. chir. u. mech. Orthopädie, Sept., 1915, p. 195.)**

Roentgen plates of such a case are shown. A comparison of the multiple exostoses with those of rhachitis, lues, chondrodystrophia fœtalis or osteogenesis imperfecta is not made, but he considers them to be anomalies of development like deformities. Disturbance of the internal secretions also plays an important rôle.

Roentgen Treatment of Thymus Hyperplasia in Childhood. **O. Cozzolino. (La Pediatria, 1914, No. 4.)**

Roentgentherapy is the best treatment of thymus hyperplasia in childhood. By careful confinement of the rays to the thymus region, the size of this organ is reduced with simultaneous maintenance of sufficient function. Owing to the pronounced susceptibility of the thymus to roentgen rays, the dose for children should be relatively small. It is neither necessary nor indicated to cause complete atrophy of the thymus, a comparative reduction in volume being sufficient. Radiographic control of the results is desirable. Roentgen therapy exerts a simultaneous favorable effect on tubercular tracheobronchial adenopathy which often exists in the presence of thymus hyperplasia. It may also be of prophylactic use, even if applied at long intervals, as it may prevent exacerbations of asthma thymicum and exercise a favorable influence in latent hypertrophy of the thymus in children with the habitus thymicolymphaticus.

Experience in Radium Treatment of Malignant Tumors **(Erfahrungen über Radiumbehandlung de malignen Tumoren). Ranzi, Schüller and Sparmann. Strahlentherap., 1914, iv, 97.**

These authors had all together 225 mg. radium and 150 mg. mesothorium. They filtered at first with lead, later with metals that produced only slight secondary rays (½ to 2 mm. thick). To exclude secondary rays non-metallic covers were placed over these. Different dosages were used in different cases, but sometimes very large individual doses, as well as large total doses, were used. Among 29 cases of tumors 6 died. In three (recurrent carcinoma of the tongue, basal cell cancer of the alae of the nose, and a tongue cancer as large as a hazelnut) the tumor disappeared; 9 were not affected, or even grew worse. In 11 cases the tumor grew smaller, and among these were sarcoma and carcinoma, for example cancer of the esophagus producing stricture. They could not see that there was any truly elective effect on tumor tissue; the normal surrounding tissue is also injured, giving rise to the possibility of perforation and hemorrhage; they encountered the latter in five cases. The analgesic effect of the rays is by no means constant. On the whole they believe that radium should only be used after operation and as a palliative measure in inoperable tumors; the malignancy of such tumors may be decreased by it. But all operable tumors should be operated upon unconditionally.

Non-operative Treatment of Carcinoma **(Zur nichtoperativen Karzinombehandlung). Allman. Strahlentherap., 1914, iv, 626.**

Allman gives a report of the mesothorium treatment of carcinoma of the uterus

at the St. George Hospital in Hamburg. Large doses were used, 150 to 200 mg., applied for 24 hours and intervals between the treatments of two to five weeks. Nickel-plated brass was used for filters, and in the beginning of the treatment lead filters also, especially in cases where there was much ichorous discharge. The injuries observed were, formation of fistulæ, severe tenesmus, hemorrhage, fever, nervous disturbances. In the intervals between the treatments arsenic, iodine and cholin were given. Of 85 cases treated 15 died; in one case the course of the disease was hastened by the irradiation. Fifteen or 20 non-operable cases were made operable. Fifteen women who had recurrences or who refused operation are now capable of working and free of symptoms.

Roentgen, Radium and Mesothorium Rays in Gynecology **(Roentgen, Radium und Mesothoriumstrahlen im Dienst der Gynäkologie). H. Kupferberg, Fortschr. d. Med., 1914, xxxii, 145.**

The author succeeded in curing all myomata treated within the course of two to three months with 2 to 10 series, varying according to the age of the patient from 30 to 100 X. Myomata in young women should be excluded from this treatment, as should submucous and subserous ones, those with pedicles, those with an ichorous discharge and those showing evidence of malignant degeneration. Roentgen treatment is also to be preferred absolutely to every form of operative procedure in metropathies and dysmenorrhoea and for artificial sterilization, because it is without any danger and does not produce the unpleasant by-effects of operation. Wertheim and Latzka have held that it was contraindicated in carcinomata of the body and cervix of the uterus, but their experiments were not thorough enough and their conclusions not well founded. In contrast with their results are the brilliant ones obtained by Krönig, Gauss, Döderlein and Bumm. The unfavorable cases for radium treatment are the abdominal carcinomata with distant metastases and recurrences after apparent radium cure; all inoperable carcinomata that are not too far advanced are favorable. Radium treatment gives at least as good results as operation, is absolutely without danger and gives great hopes for the future.

Further Experience with Mesothorium Treatment of Carcinoma **(Unsere weiteren Erfahrungen mit der Mesothoriumbehandlung des Karzinoms). E. Döderlein and Von Seuffert. München. med. Wchnschr., 1914, lxi, 225.**

Among 153 cases of carcinoma of the uterus treated by the authors 24 died; 98 are still under treatment; 31 of the women at present have no subjective or objective symptoms. Nineteen of these cases were operable. Among 11 cases of carcinoma of the rectum two were completely cured, none died, and the rest are still under treatment. The fever that appears after mesothorium treatment is to be regarded as an absorption fever. To avoid it carcinomatous masses should be removed. The authors no longer use lead filters, but only nickel-plated brass filters, which do not produce any corrosive effect. In cases that turn out badly the physician cannot tell whether the result is due to the radiant treatment or the carcinoma itself.

Radium Treatment of Carcinoma of the Esophagus and Cardia **(Zur Radiumtherapie des Oesophagus und Kardiakarzinoms). Carl Lewin. Therap. d. Gegenw., 1914, lv, 103.**

The author has treated 25 cases and, with the exception of a few that were hopeless from the beginning, he has had more or less favorable results. The subjective symptoms, such as stenosis, as well as the objective

findings on examination with sounds and roentgen rays, showed improvement within a comparatively short time. One case was particularly noteworthy; so far as clinical appearances went it was completely cured after five months. The radium or mesothorium was placed in a platinum or gold filter, and covered with a hard rubber cover, then placed on a slender silk bougie and introduced by means of a hollow sound. As a rule 50 to 80 mg. were used, and left in position 2 to 4 hours. This treatment was given two to three times a week for about five weeks, and was combined with external irradiation with roentgen rays or radium, and sometimes with injections of atoxyl.

Radium and Mesothorium in Ophthalmology **(Radium und Mesothorium in der Ophthalmologie). Flemming. Strahlentherap., 1914, iv, 861.**

Flat carriers were used, one of which contained a few mg. radium, the other a little more mesothorium. The results of biological tests of this apparatus with different methods of filtration are given. Irradiation of the rabbit's eye for from a few to many hours caused keratitic changes and contraction of the pupil, and changes in the skin of the lid that required some weeks for recovery. Experimental injuries of the rabbit's eye, with or without infection, were influenced to the extent of quicker scar formation and healing. Experimental tuberculosis of the eye could be influenced only when the irradiation was given immediately after the infection. An emulsion of tubercle bacilli was effected by the rays, 168 mg.-hours being absolutely bactericidal, but in this respect exposure to the sun's rays was more effective. In the normal human eye irradiations of a degree that would cause considerable injury to the skin did not produce any changes except contraction of the pupil, and here as in rabbits the iris was particularly sensitive. In diseases of the eyeball results were obtained only in flaccid ulcers, the lens and the eye ground were very insensitive to the rays. The conjunctiva is less sensitive than the skin, but may be severely injured by too prolonged irradiation (scars and entropion). Trachoma is not any more favorably affected than by the older methods of treatment. Good results were obtained in exanthelasma and in certain tumors: angiomata, cancroids that were not too extensive and in sarcomatous tumors.

Disturbance of Ovarian Function in Myoma of the Uterus and Some Disputed Points in Regard to Myoma **(Ueber Störung der Eierstocksfunktion bei Uterusmyom und über einige strittige Myomfragen). August Mayer and Erich Schneider. München. med. Wchnschr., 1914, lxi, 1041.**

These authors take up a subject that only concerns roentgen therapy indirectly, but that is, nevertheless, of great interest to roentgenologists. They utilized Abderhalden's dialysis to examine the behavior of the blood serum of 30 patients with myoma toward ovaries, and came to the conclusion that the serum of the majority of myoma patients katabolizes their own ovaries but katabolizes the ovaries of other myoma patients in only about half the cases. This is due to an extraordinary specificity of the ferments. With reference to the question of whether dysfunction is the cause or the result of the myoma, they conclude that normal growth and normal function of the uterus are the results of normal action of the ovaries. The cyclic transformation of the uterine mucous membrane takes place only if the ovary is functioning normally. Under both normal and pathological conditions the function and growth of the uterus depend on the ovary. Therefore the dysfunction of the ovary that is found in myoma is not a chance occurrence, but must be regarded as the cause of the myoma.

DEPARTMENT OF BOOK REVIEWS

Editor, Edward H. Skinner, M.D., Kansas City, Mo.

Cassell's Cyclopedia of Photography. Edited by Bernard E. Jones, Editor of "Work." Illustrated by Twenty-four Full-Page Plates in Color and Half-Tone, and by Hundreds of Line Drawings in the Text. New York: Funk and Wagnalls Company. 1915. Price, $3.75.

The roentgenologist is usually interested in photographic work. If this interest is not natural it is frequently forced upon him. The dependence of good roentgen negatives upon dark-room technique forces the roentgenologist in the intricacies of photographic chemistry and allied subjects. Because the roentgenologist maintains a dark-room and a camera outfit for reductions and lantern slides, he is often induced to assist his colleagues in photomicrography, medical illustrations, photography, etc.

Therefore Cassell's Cyclopedia of Photography will be a necessary equipment for the roentgen laboratory. It gives technical information upon lenses, color photography, photographic chemistry. It gives detailed answers for the innumerable questions which arise in photography.

The roentgen portion of the book is by J. I. Pigg of England. It is quite brief. But the value of this book to the roentgenologist does not depend upon this so much as the great amount of information upon the other branches of photography which it contains.

The contributors are mostly members of the Royal Photographic Society of England. They have included every accepted photographic term and surveyed the whole field of photographic knowledge.

It is remarkable how interesting such an addition to one's library will be. Obscure terms, formulæ, apparatus, lenses, speed of plates, historical facts—in fact, everything connected in the least with photographic science is thoroughly discussed in detail.

Das Röentgenverfahrens in der Laryngologie. By Dr. M. Weingaertner, Assistant an der Kgl. Universitäts Klinik und Poliklinik für Hals und Nasenhranke, Berlin. With a foreword by Geh. Med. Rat. Prof. Dr. Killian, Berlin. 101 text pages with 56 figures upon 8 photographic inserts, 8 figures in the text and 8 stereoscopic roentgenograms. Band 8 of the Bibliothek der physickalisch-medizinischen Techniken. Edited by Heinz Bauer. Verlag von Herman Meusser. Berlin. 1914. Price, $4.00.

This contribution by Weingaertner seeks to establish the practical value of roentgen rays in laryngology. It is well illustrated with actual photographic reductions, among which there are 8 pairs of stereorentgenograms. The author divides his subject under five headings: Anatomy, Physiology, Pathology, Foreign Bodies and Therapy. There are also eleven pages carrying a complete bibliography of previous roentgen literature in this specialty.

The introduction by Killian is unusually complimentary to the ability of the roentgenologist to assist the laryngologist. As Killian says, "the wildest dreams of the laryngologist have come true, and to the examinations by external signs and the internal use of the branchoscope we now add transverse inspection. Where formerly the bronchial topography had to be studied in autopsy specimens, now one can by fluoroscope and stereoroentgenograms study far better in the living individual."

Weingaertner has entered into most intimate descriptions of this limited portion of the anatomy, and it is regrettable that American roentgenologists are not afforded a translation. There have been several other similar publications in German by Scheier and E. Fraenkel, but this subject has hardly been

touched in American literature. We refer more especially to the roentgen study of the voice, speech, respiration and deglutition. Tuberclosis of the lungs is not discussed in this little volume. It seems that every primary and secondary disease of the larynx or bronchial tree which interests the laryngologist receives ample treatment. Only one fault is apparent, and that the failure of the author to provide headings or divisions anywhere in the book. To find an index reference, one must scan the pages indicated.

This book is one of the roentgen series which Heinz Bauer was editing at the time of his death. They are all compact, well-illustrated volumes, and each one worthy of a translation, especially the volumes by Groedel upon the Heart and Reyher upon Pediatric Roentgenology.

LEITFADEN DES ROENTGENVERFAHRENS FÜR DAS ROENTGENOLOGISCHE HILFSPERSONAL, By Dr. E. Fürstenau, Dr. M. Immelman und Dr. J. Schütze. 389 pages with 281 illustrations. Verlag von F. Enke. Stuttgart. 1914. Price, $3.45.

This volume deals entirely with the technique of roentgenology, and is essentially for laboratory assistants. It is a new departure in roentgen literature.

In Germany there are trade schools for roentgen assistants. This vocation is a trade or occupation like an electrician or photographer. After taking a course in one of these roentgen schools the student becomes an apprentice in a roentgen laboratory and develops into an accomplished technician capable of handling the various mechanical activities necessary to produce roentgenograms for inspection and interpretation by the physician-roentgenologist.

All of the information gathered between the covers of this book may be found elsewhere. But it is arranged and expressed in a manner easily understood by the novice. It must not be assumed that this book is superficial—quite the contrary. It is marvelously complete and understandable.

In the first place, 120 pages are devoted to high-tension apparatus, including the measurement of roentgen rays. Then 60 pages are given to roentgen anatomy; 40 pages to the exposure room, therapy room and dark room; 50 pages to the technique of exposure positions; 30 pages to photographic processes; 20 pages to the intricacies of roentgen therapy, etc.

The illustrations are profuse and afford the student great help in understanding the text.

As related before, this book contains nothing distinctly new, but if every assistant in American laboratories could have such a book as this constantly at hand there would be more expeditious handling of patients and less necessity for reiteration of directions. The reviewer's assistant remarked after the inspection of this volume, "Why is not something like this published in English?"

No doubt everything in this book has already been published in the American journals, but never has there been such a splendid collection of technical information.

DIE ZAHNÄRTZLICHE RÖNTGENOLOGIE. By Dr. J. Reinmöller und Dr. Burchard. Verlag der Dykschen Buchhandlung. Leipzig. 1914. 209 pages, 53 illustrations, 78 roentgenograms upon 13 photographic pages. Price, $3.00.

This text book and atlas for dentists and students is the second volume of the dental series put out by the Dykschen Buchhandlung at Leipzig. One is immediately impressed with the beautiful atlas of photographic reproductions of dental films and plates. The tooth films are reproduced in actual sizes, but the sinus plates are reduced one-half to one-third. These reproductions are exquisite in detail and eminently satisfactory for study.

The first 120 pages are taken up by complete details of roentgen installations for dentists, including ample descriptions of the technique of intra-oral and extra-oral dental exposures. Thirty-four pages are devoted to this dental technique, which is a fair sample of the sensible division of space which characterizes this commendable publication. Sixty pages offer interpretative information under eleven sub-headings.

There is one unusual chapter carrying a frank discussion upon the choice and purchase of individual dental *x*-ray outfits. The choice of coil or interruptless apparatus is largely a matter of economy or volume of work. Large clinics naturally require interruptless outfits, but the author recommends coil apparatus for the simpler dental installations. No doubt the author is unfamiliar with the small interruptless outfits which are proving so satisfactory in dental work. The author contends that it will not be economical or favor efficiency if the dentist installs his own roentgen apparatus for taking possibly three to five films daily. Such a small amount of work can be referred more satisfactorily to a roentgen laboratory.

The nomenclature of the chapters on interpretation of dental pathology is distinctly scientific. The term granuloma has supplanted the familiar "Apical abscess." There is the evident purpose to describe pathological conditions about the teeth in terms which coincide with a physician's understanding of bone pathology. For years dentists have rather sidestepped pathological study for the technical proficiency necessary to successful dentistry. The mechanical restoration of the remains of a tooth has fascinated the dentist almost to the exclusion of a sane consideration of the tolerance of the bone about such a root.

Roentgen films are furnishing spectacular evidence of the shortcomings of this ambitious mechanical dentistry. It would almost seem that the modern interest which physicians display in securing healthy teeth is about to force the dentist to consider the tolerance of the alveolar processes to these clever mechanical devices.

This small volume carries much evidence of the pathological consequences dependent upon dental mechanics applied without a conception of dental pathology. These dental roentgenograms surely carry a message to dentists, and they also furnish the roentgenologist with a good interpretative knowledge of dental pathology.